KAISAI

INSTRUKCJA OBSŁUGI
urządzeń klimatyzacyjnych KAISAI

SPLIT WALL-MOUNTED TYPE

R ON-OFF SERIES

EuroClima

DO 5 LAT gwarancji*

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1. Precaution

1.1 Safety Precaution

- **To prevent injury to the user or other people and property damage, the following instructions must be followed.**
- **Incorrect operation due to ignoring instruction will cause harm or damage.**
- **Before service unit, be sure to read this service manual at first.**

1.2 Warning

➢ Installation

- **Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.**

There is risk of fire or electric shock.

- **For electrical work, contact the dealer, seller, a qualified electrician, or an Authorized service center.**

Do not disassemble or repair the product, there is risk of fire or electric shock.

- **Always ground the product.**

There is risk of fire or electric shock.

- **Install the panel and the cover of control box securely.**

There is risk of fire of electric shock.

- **Always install a dedicated circuit and breaker.**

Improper wiring or installation may cause fore or electric shock.

- **Use the correctly rated breaker of fuse.**

There is risk of fire or electric shock.

- **Do not modify or extend the power cable.**

There is risk of fire or electric shock.

- **Do not install, remove, or reinstall the unit by yourself(customer).**

There is risk of fire, electric shock, explosion, or injury.

- **Be caution when unpacking and installing the product.**

Sharp edges could cause injury, be especially careful of the case edges and the fins on the

condenser and evaporator.

- **For installation, always contact the dealer or an Authorized service center.**

There is risk of fire, electric shock, explosion, or injury.

- **Do not install the product on a defective installation stand.**

It may cause injury, accident, or damage to the product.

- **Be sure the installation area does not deteriorate with age.**

If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

- **Do not let the air conditioner run for a long time when the humidity is very high and a door or a window is left open.**

Moisture may condense and wet or damage furniture.

- **Take care to ensure that power cable could not be pulled out or damaged during operation.**

There is risk of fire or electric shock.

- **Do not place anything on the power cable.**

There is risk of fire or electric shock.

- **Do not plug or unplug the power supply plug during operation.**

There is risk of fire or electric shock.

- **Do not touch (operation) the product with wet hands.**

There is risk of fire or electric shock.

- **Do not place a heater or other appliance near the power cable.**

There is risk of fire and electric shock.

- **Do not allow water to run into electric parts.**

It may cause fire, failure of the product, or electric shock.

- **Do not store or use flammable gas or combustible near the product.**

There is risk of fire or failure of product.

- **Do not use the product in a tightly closed space for a long time.**

Oxygen deficiency could occur.

- **When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.**

Do not use the telephone or turn switches on or off.

There is risk of explosion or fire.

- **If strange sounds, or small or smoke comes from product. Turn the breaker off or disconnect the power supply cable.**

There is risk of electric shock or fire.

- **Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.**

There is risk of property damage, failure of product, or electric shock.

- **Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)**

There is risk of physical injury, electric shock, or product failure.

- **When the product is soaked (flooded or submerged), contact an Authorized service center.**

There is risk of fire or electric shock.

- **Be caution that water could not enter the product.**

There is risk of fire, electric shock, or product damage.

- **Ventilate the product from time to time when operating it together with a stove, etc.**

There is risk of fire or electric shock.

- **Turn the main power off when cleaning or maintaining the product.**

There is risk of electric shock.

- **When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.**

There is risk of product damage or failure, or unintended operation.

- **Take care to ensure that nobody could step on or fall onto the outdoor unit.**

This could result in personal injury and product damage.

➢ CAUTION

- **Always check for gas (refrigerant) leakage after installation or repair of product.**

Low refrigerant levels may cause failure of product.

- **Install the drain hose to ensure that water is drained away properly.**

A bad connection may cause water leakage.

- **Keep level even when installing the product.**

It can avoid vibration of water leakage.

- **Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**

It may cause a problem for your neighbors.

- **Use two or more people to lift and transport the product.**

Avoid personal injury.

- **Do not install the product where it will be exposed to sea wind (salt spray) directly.**

It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➢ Operational

- **Do not expose the skin directly to cool air for long periods of time. (Do not sit in the draft).**

This could harm to your health.

- **Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigerant system.**

There is risk of damage or loss of property.

- **Do not block the inlet or outlet of air flow.**

It may cause product failure.

- **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**

There is risk of fire, electric shock, or damage to the plastic parts of the product.

- **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**

There is risk of personal injury.

- **Do not step on or put anything on the product. (outdoor units)**

There is risk of personal injury and failure of product.

- **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

- **Do not insert hands or other object through air inlet or outlet while the product is**

operated.

There are sharp and moving parts that could cause personal injury.

- **Do not drink the water drained from the product.**

It is not sanitary could cause serious health issues.

- **Use a firm stool or ladder when cleaning or maintaining the product.**

Be careful and avoid personal injury.

- **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and mew batteries or different types of batteries.**

There is risk of fire or explosion.

- **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**

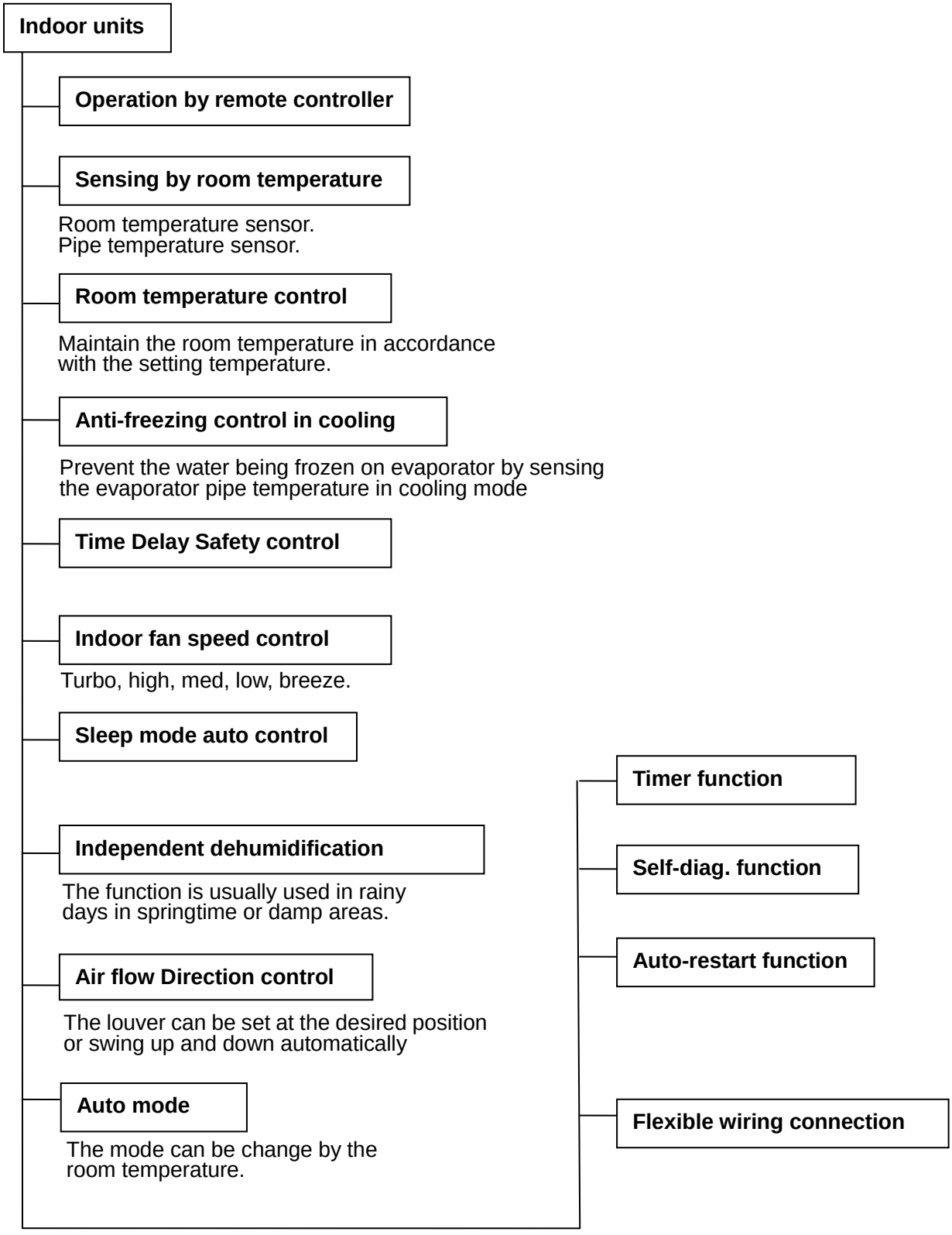
They may burn of explode.

- **If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.**

The chemical in batteries could cause burns or other health hazards

The designs, and information in this book are subject to change without notice for product improvement.

2. Function


Indoor units
Operation by remote controller
Sensing by room temperature
Room temperature sensor.
Pipe temperature sensor.
Room temperature control
Maintain the room temperature in accordance with the setting temperature.
Anti-freezing control in cooling
Prevent the water being frozen on evaporator by sensing the evaporator pipe temperature in cooling mode
Time Delay Safety control
Indoor fan speed control
Turbo, high, med, low, breeze.
Sleep mode auto control
Independent dehumidification
The function is usually used in rainy days in springtime or damp areas.
Air flow Direction control
The louver can be set at the desired position or swing up and down automatically
Auto mode
The mode can be change by the room temperature.
Timer function
Self-diag. function
Auto-restart function
Flexible wiring connection

Outdoor units

Power relay control

Low noise air flow system

Anti-rust cabinet

Made from electrolytic zinc steel sheet and anti-rust coated components.

Valve protection cover

It protects the valves and prevents water from dripping.

3. Dimension

3.1 Indoor Units

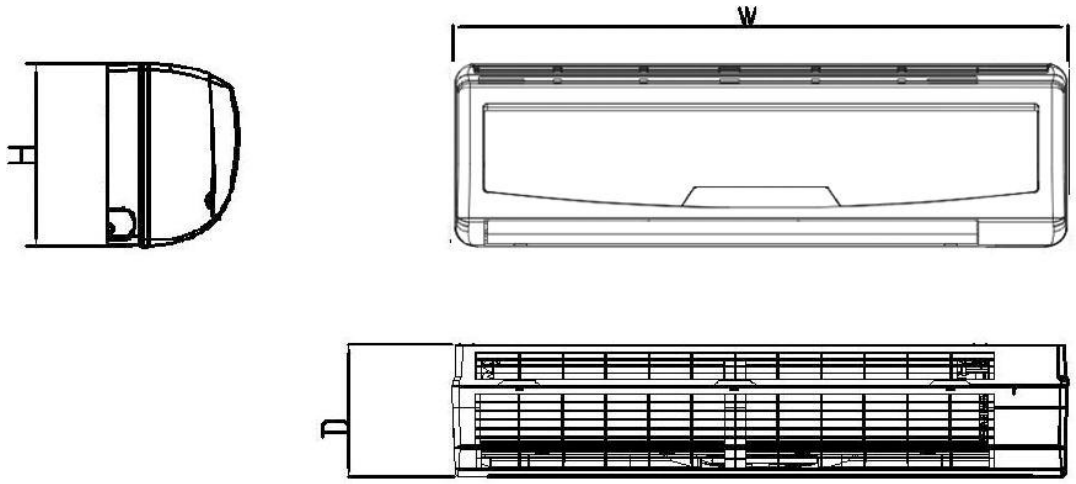


Figure 1:

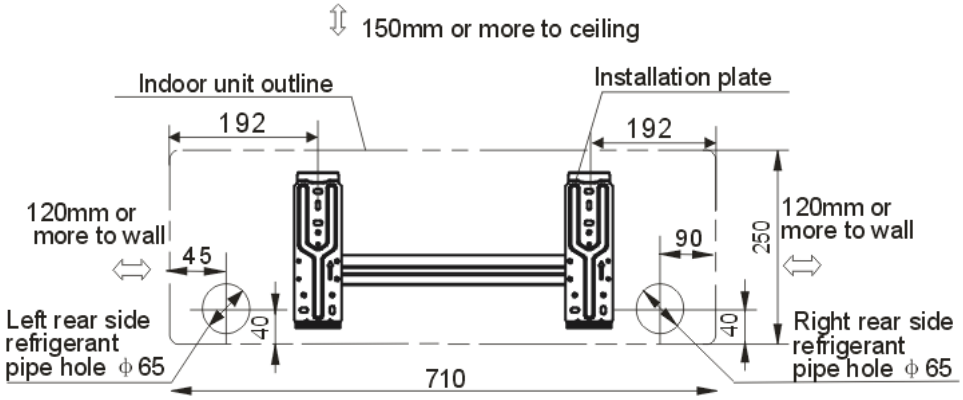


Figure 2:

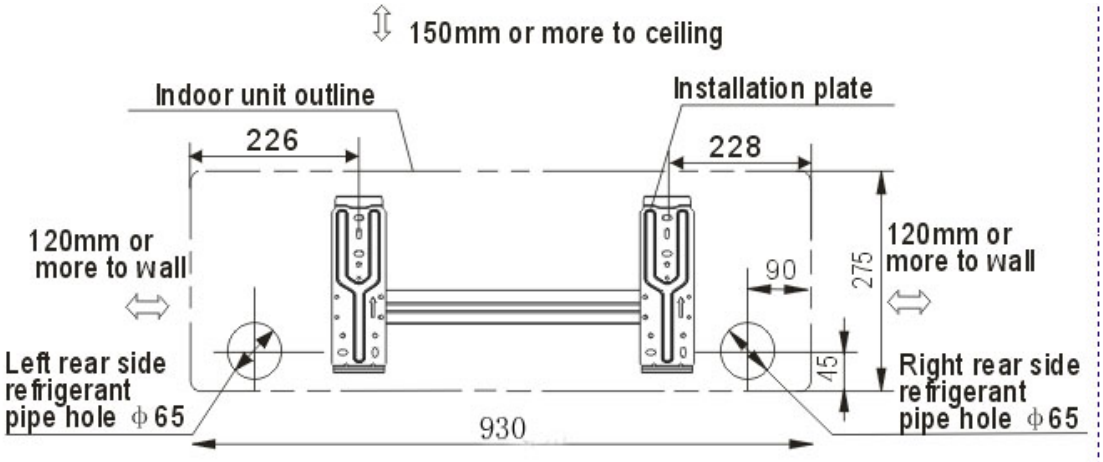


Figure 3:

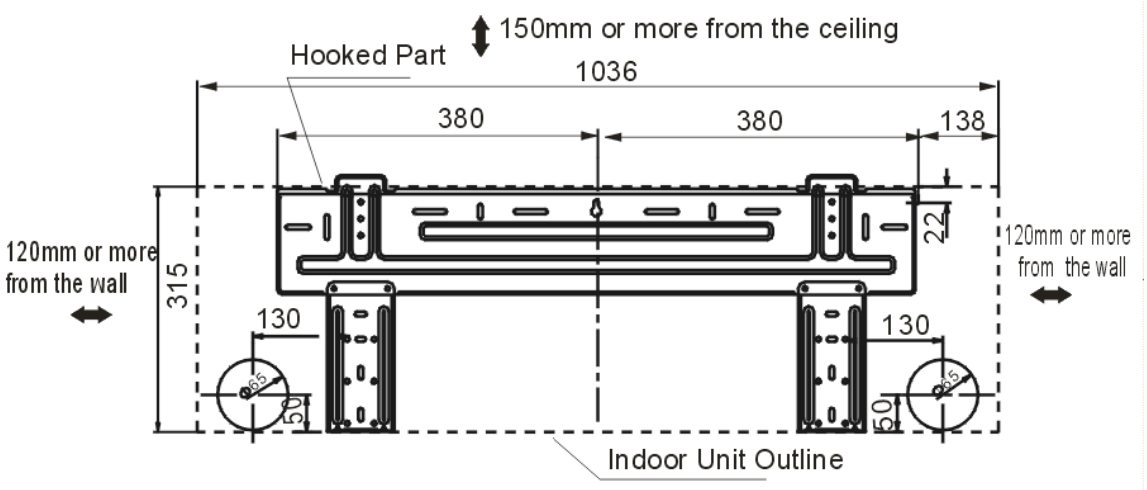
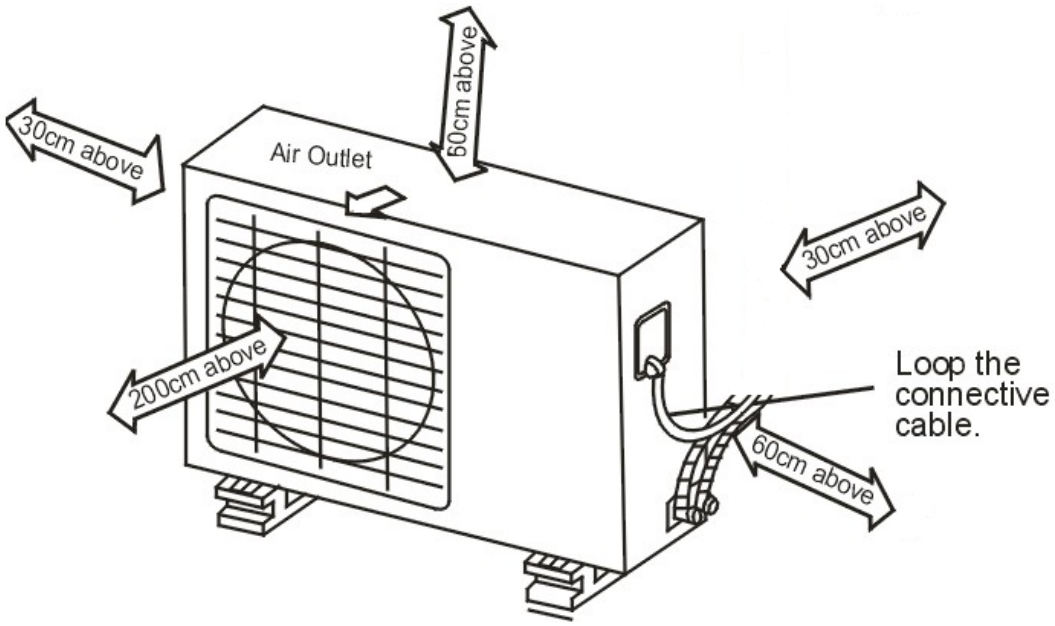
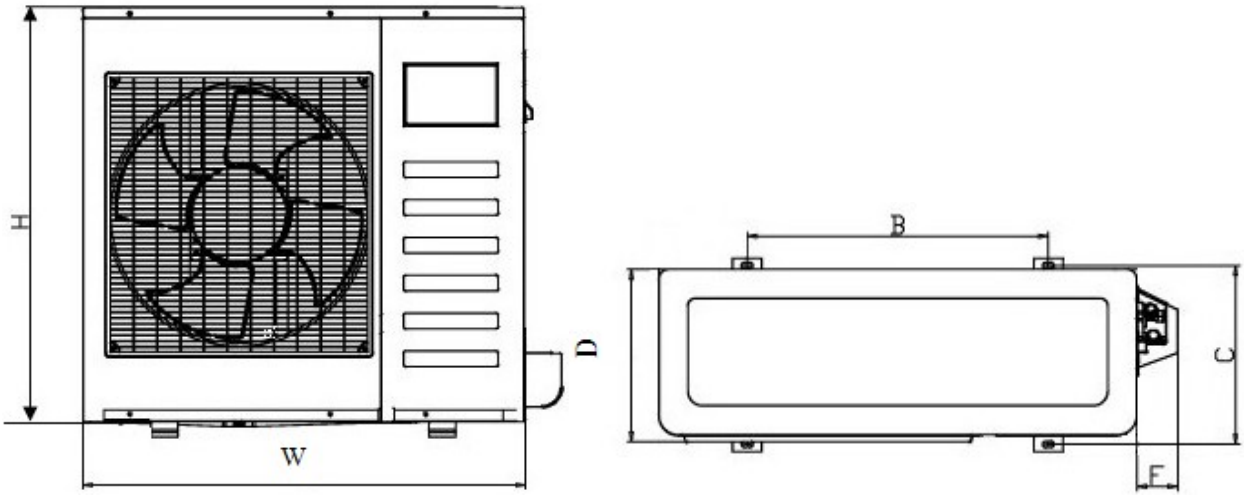


Figure	Models	W	D	H
Figure 1	7k,9k	710	189	250
Figure 2	18k	930	198	275
Figure 3	21k,24k	1036	230	315

3.2 Outdoor Units

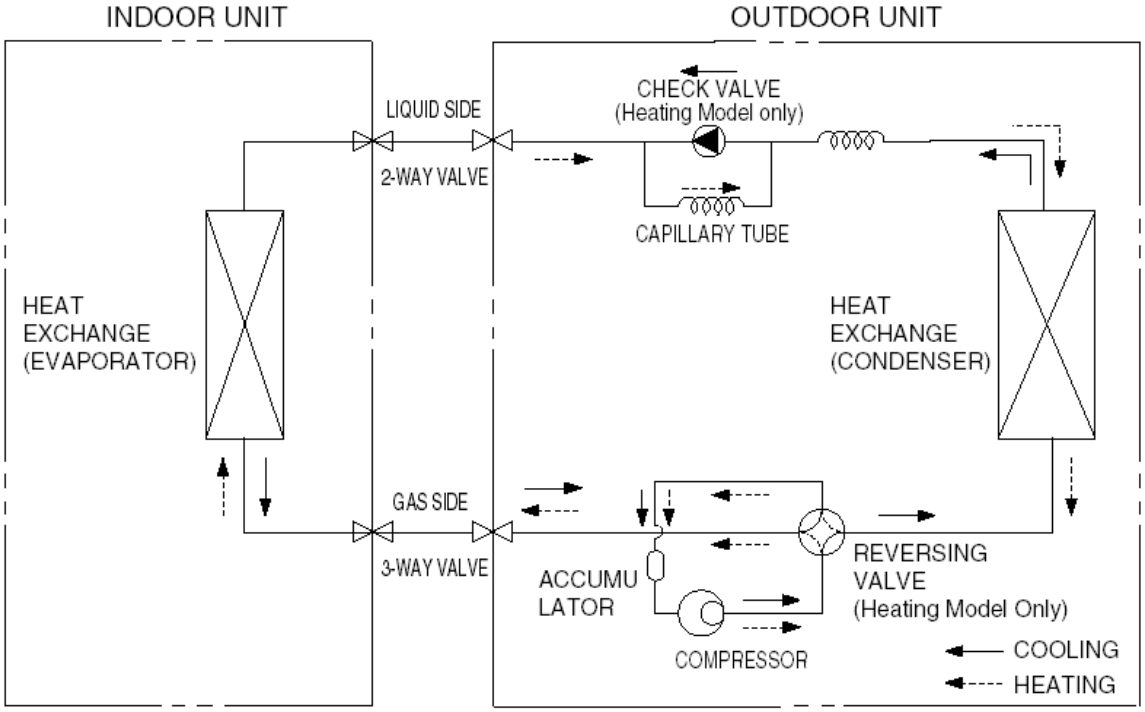




Model	W	H	D	B	C	F
7k	685	430	260	460	276	57
9k	700	535	235	458	250	60
18k	760	590	285	530	290	63
21k(MOP-21H-QB6W)	820	330	595	523	340	50
21k,24k	845	695	335	560	335	73

4. Refrigerant Cycle Diagram

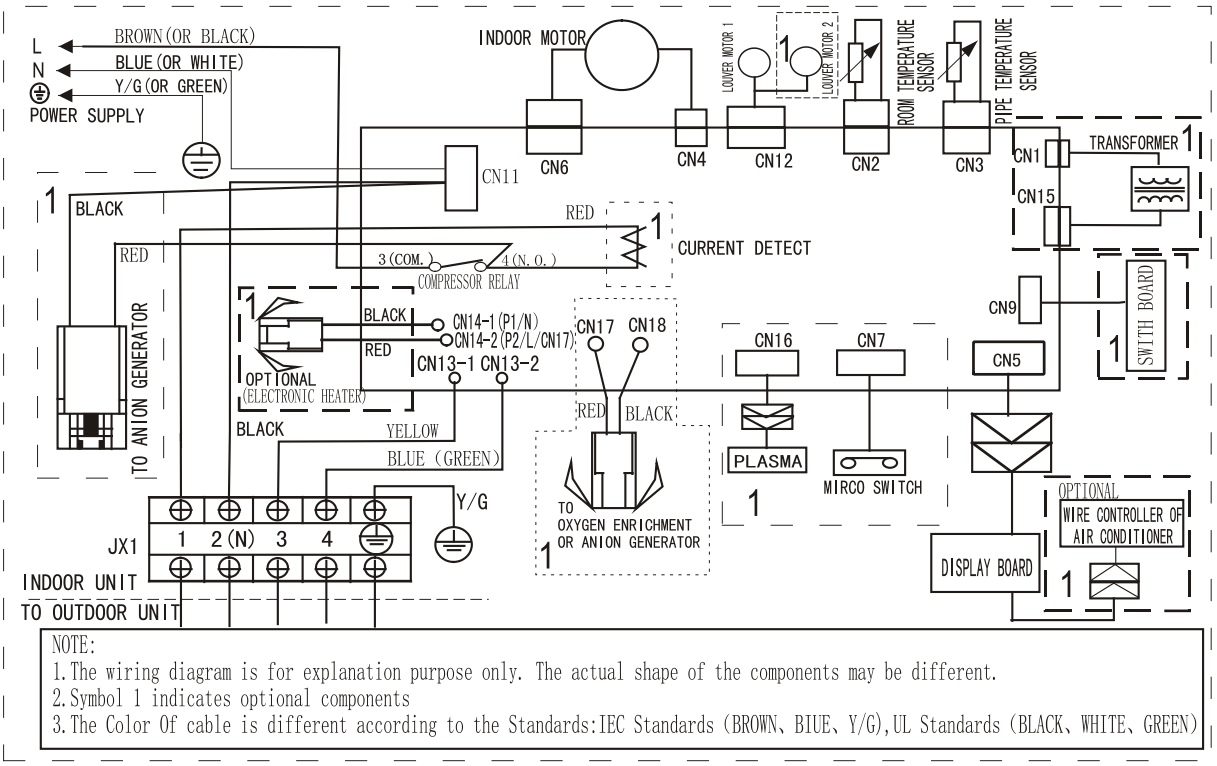
For heat pump models:



5. Wiring Diagram

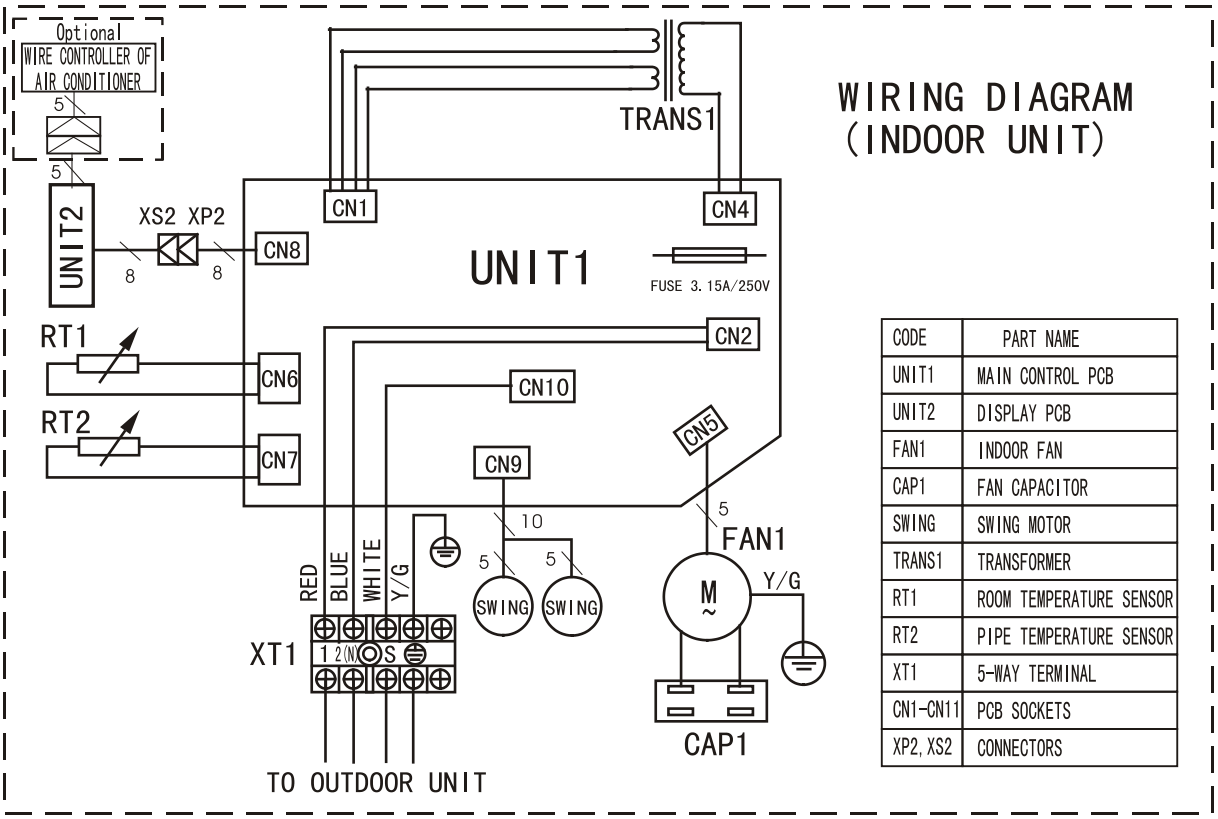
5.1 Indoor Units

KSR1-07HRN1-QC2(A) KSR1-09HRN1-QC2(A) KSR1-18HRN1-QB8



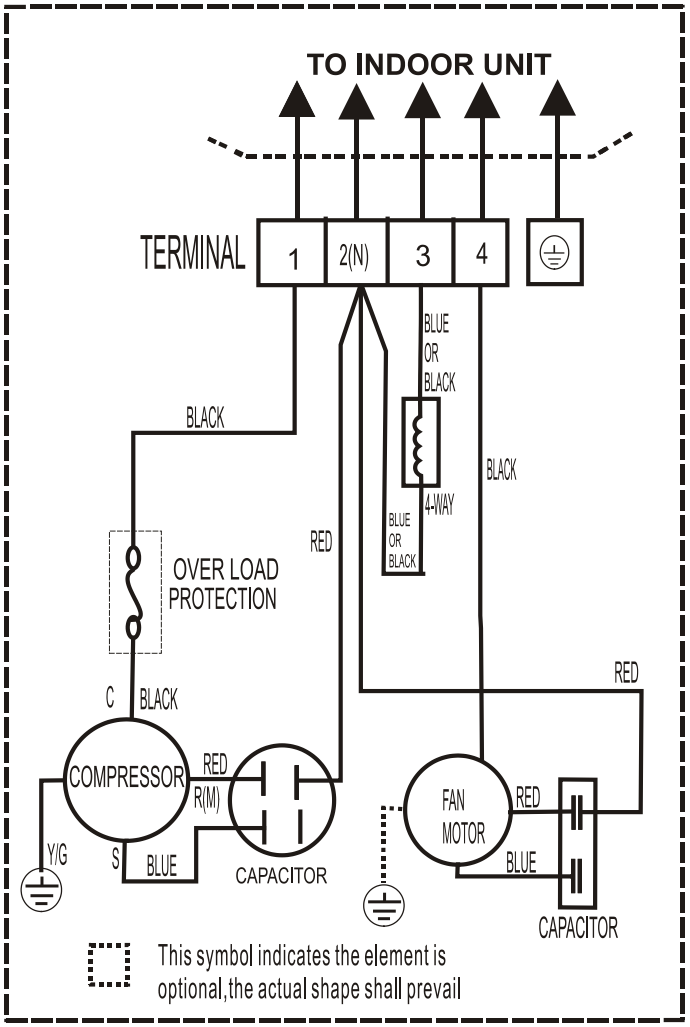
NOTE:
1. The wiring diagram is for explanation purpose only. The actual shape of the components may be different.
2. Symbol 1 indicates optional components
3. The Color Of cable is different according to the Standards:IEC Standards (BROWN、BIUE、Y/G),UL Standards (BLACK、WHITE、GREEN)

KSR1-21HRN1-QB8W KSR1-21CR-QB6W KSR1-21HR-QB6W KSR1-24HRN1-QB8W

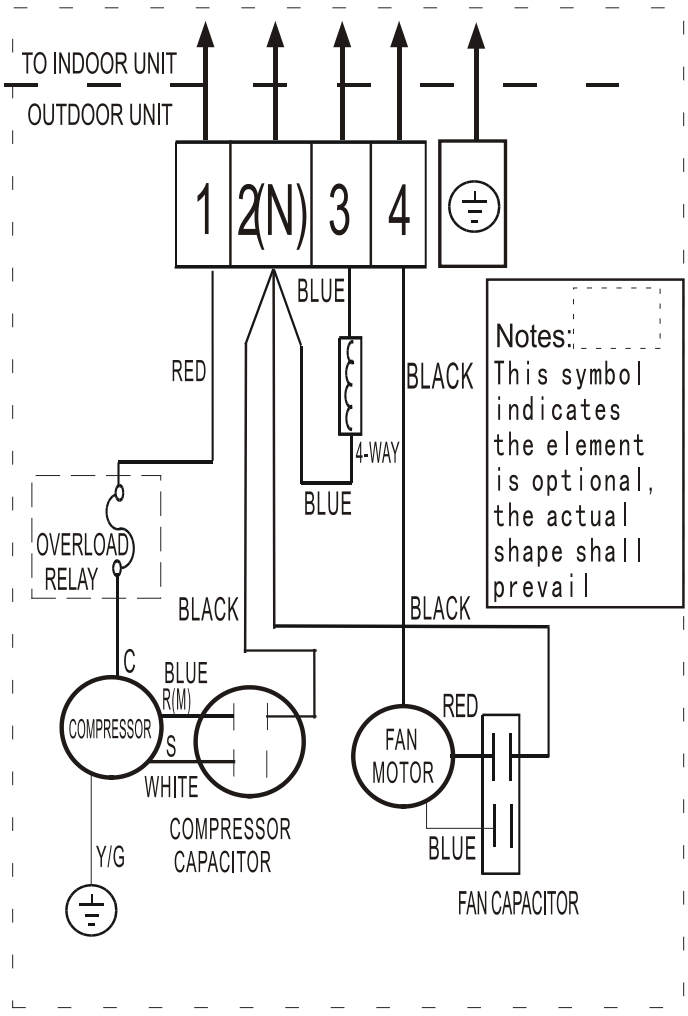


5.2 Outdoor Units

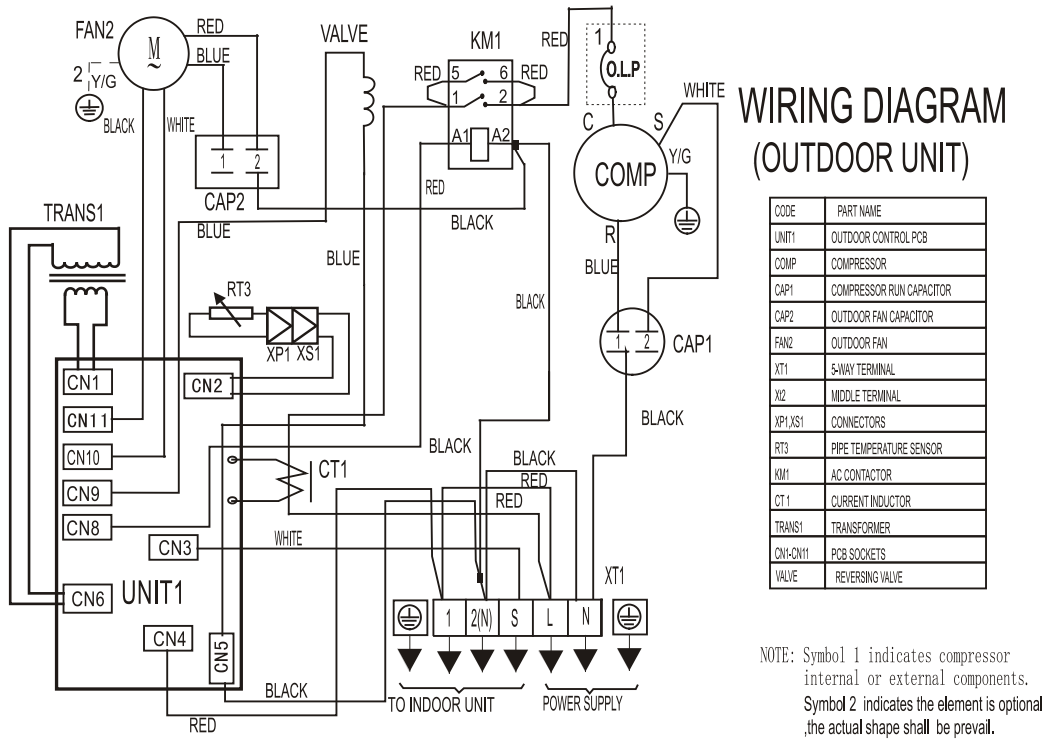
KOK1-07HN1-QC2 KOA1-09HN1-QC2



KOE-18HN1-QB8

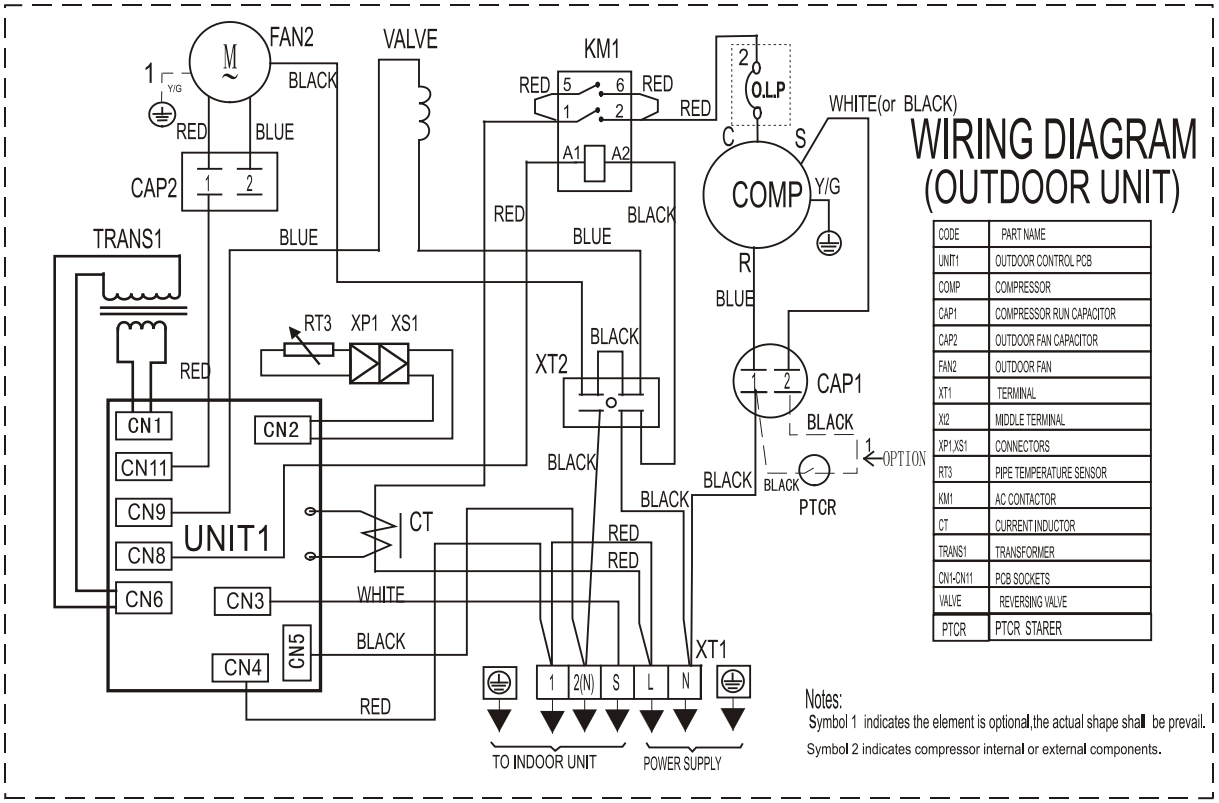


KOF-21HN1-QB8W K0F2-21C-QB6W KOP-21H-QB6W



CODE	PART NAME
UNIT1	OUTDOOR CONTROL PCB
COMP	COMPRESSOR
CAP1	COMPRESSOR RUN CAPACITOR
CAP2	OUTDOOR FAN CAPACITOR
FAN2	OUTDOOR FAN
XT1	5-WAY TERMINAL
XI2	MIDDLE TERMINAL
XP1,XS1	CONNECTORS
RT3	PIPE TEMPERATURE SENSOR
KM1	AC CONTACTOR
CT1	CURRENT INDUCTOR
TRANS1	TRANSFORMER
CN1-CN11	PCB SOCKETS
VALVE	REVERSING VALVE

KOF2-24HN1-QB8W



CODE	PART NAME
UNIT1	OUTDOOR CONTROL PCB
COMP	COMPRESSOR
CAP1	COMPRESSOR RUN CAPACITOR
CAP2	OUTDOOR FAN CAPACITOR
FAN2	OUTDOOR FAN
XT1	TERMINAL
XI2	MIDDLE TERMINAL
XP1,XS1	CONNECTORS
RT3	PIPE TEMPERATURE SENSOR
KM1	AC CONTACTOR
CT	CURRENT INDUCTOR
TRANS1	TRANSFORMER
CN1-CN11	PCB SOCKETS
VALVE	REVERSING VALVE
PTCR	PTCR STARER

6. Installation details

6.1 Wrench torque sheet for installation

Outside diameter		Torque	Additional tightening torque
mm	**inch**	**N.cm**	**N.cm**
Φ6.35	1/4	1500 (153kgf.cm)	1600 (163kgf.cm)
Φ9.52	3/8	2500 (255kgf.cm)	2600 (265kgf.cm)
Φ12.7	1/2	3500 (357kgf.cm)	3600 (367kgf.cm)
Φ16	5/8	4500 (459kgf.cm)	4700 (479kgf.cm)

6.2 Connecting the cables

The power cord of connect should be selected according to the following specifications sheet.

Rated current of appliance	Nominal cross-sectional area (mm^2)
>3 and ≤6	0.75
>6 and ≤10	1.0
>10 and ≤16	1.5
>16 and ≤25	2.5

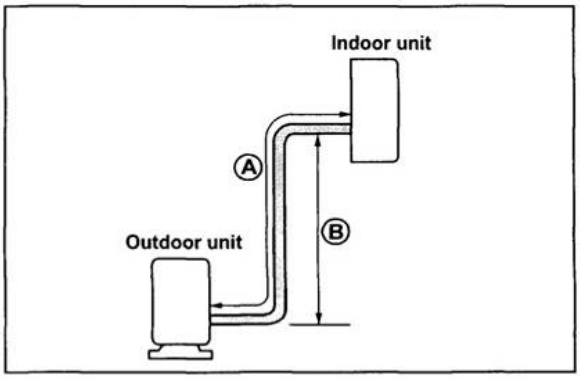
The cable size and the current of the fuse or switch are determined by the maximum current indicated on the nameplate which located on the side panel of the unit. Please refer to the nameplate before selecting the cable, fuse and switch.

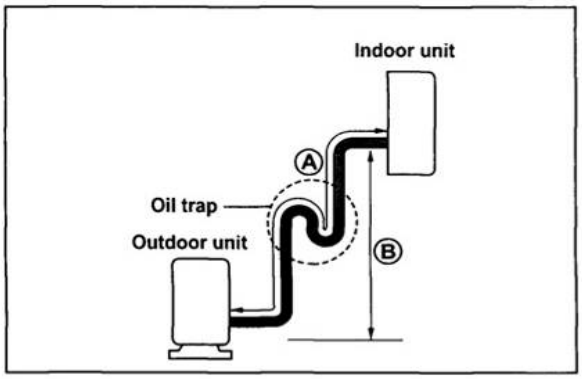
6.3 Pipe length and the elevation

The pipe length and refrigerant amount:

Model	Connective pipe length	Air purging	Additional amount of refrigerant
All	Less than 5m	Use vacuum pump	----------
7k,9k,18k	More than 5m	Use vacuum pump	(Pipe length – 5) × 30g/m
21k,24k	More than 5m	Use vacuum pump	(Pipe length – 5) × 60g/m

Model	**Standard length (m)**	**Max. Elevation B (m)**	**Max. Length A (m)**
7k,9k	5	5	10
18k	5	8	15
21k,24k	5	10	20





Caution:

Capacity test is based on standard length and maximum allowance length is based on system reliability.

Oil trap should be installed per 5-7 meters.

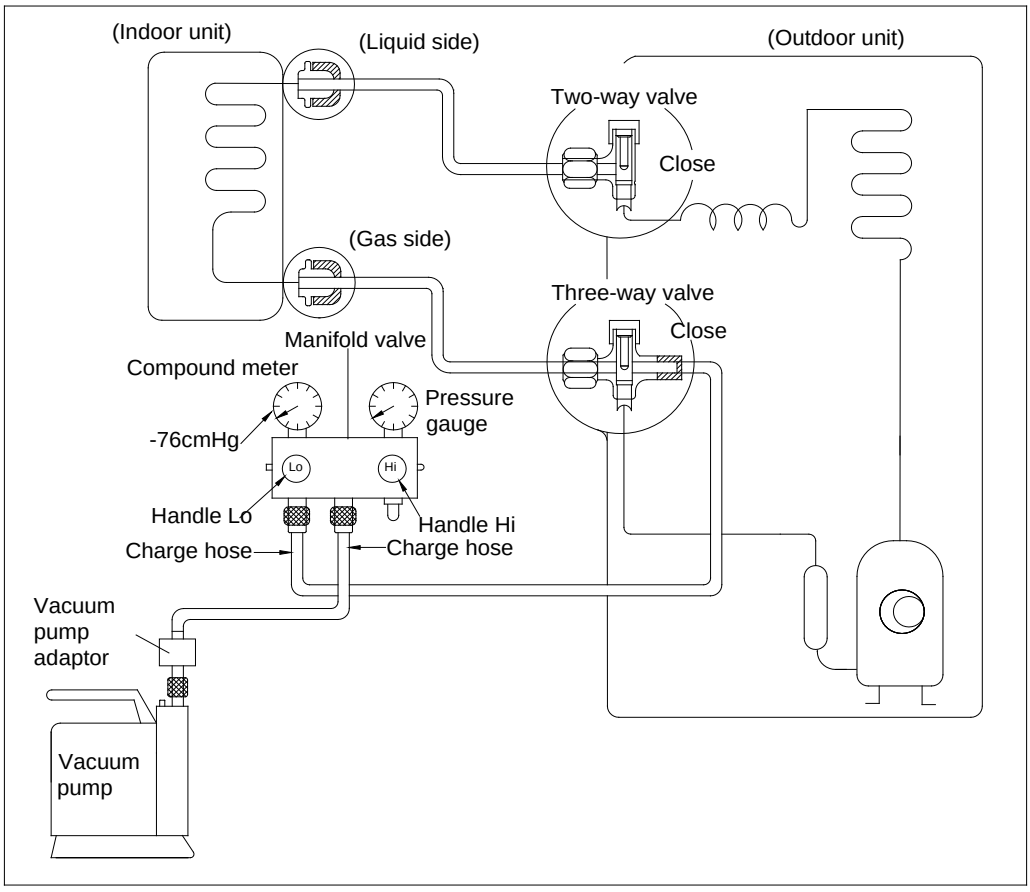
6.4 Air purging with vacuum pump

Air and moisture in the refrigerant system have undesirable effects as below:

- Pressure in the system rises.
- Operating current rises.
- Cooling or heating efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Air purging with vacuum pump



Procedure

1. Completely tighten the flare nuts of the indoor and outdoor units, connect the manifold valve charge.
2. Connect the charge hose connection to the vacuum pump.
3. Fully open the handle Lo of the manifold valve.
4. Operate the vacuum pump to evacuate. After starting evacuation, slightly loose the flare nut of the Lo valve on the gas pipe side and check the air is entering. (Operation noise of the vacuum pump changes and a compound meter indicates 0 stead of minutes)
5. After the evacuation is complete, fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Make evacuation for 15 minutes or more and check the compound meter indicates -76cmHg.

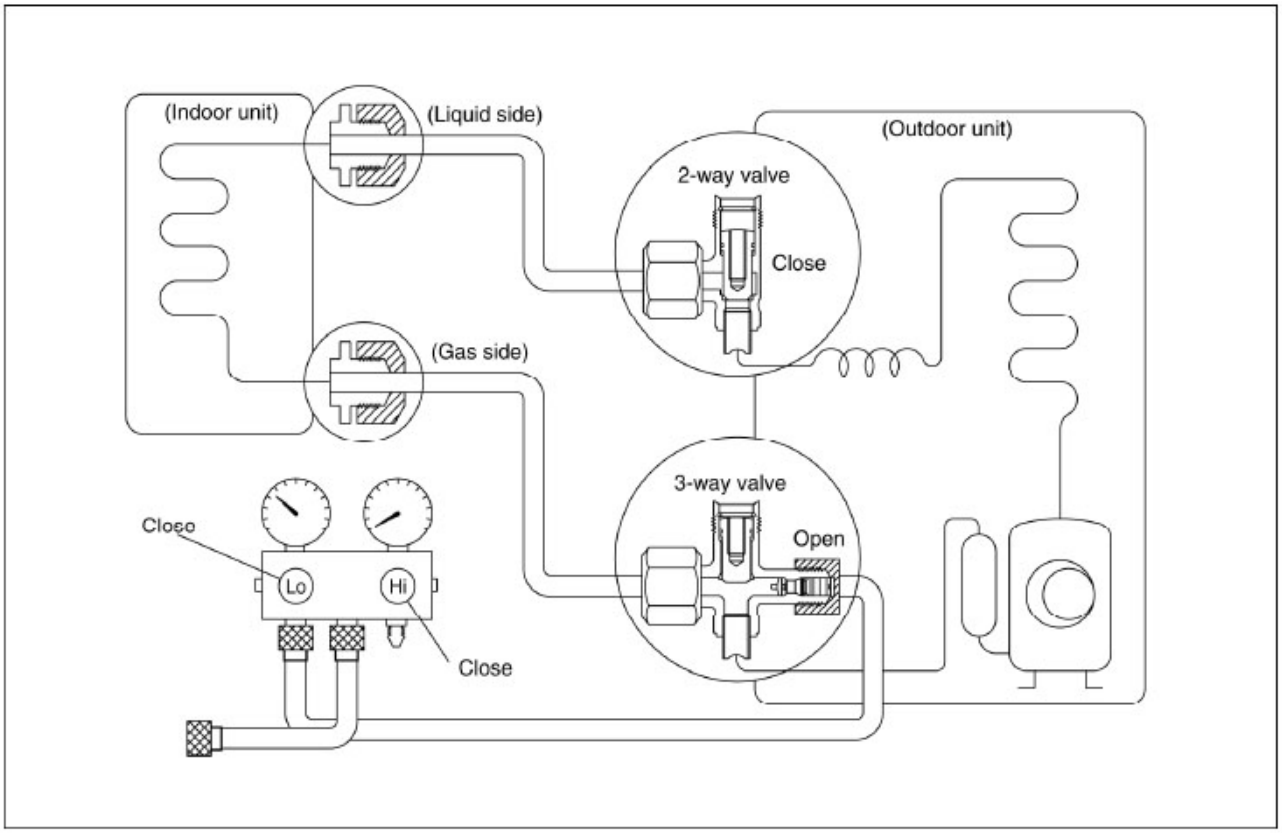
6. Turn the stem of the Hi valve about 45°counterclockwise for 6 or 7seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure.
7. Remove the charge hose from the Lo pressure charge hose.
8. Fully open the Hi and Lo packed valve.
9. Securely tighten the cap of the packed valve.

Gas leak check

Soap water method

Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

6.5 Pumping down (Re-installation)



Procedure

1. Confirm that both the 2-way and 3-way valves are set to the opened position.

Remove the valve stem caps and confirm that the valve stems are in the opened position.

Be sure to use a hexagonal wrench to operate the valve stems.

2. Operate the unit for 10 to 15 minutes.

3. Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.

Connect the charge hose with the push pin to the gas service port.

4. Air purging of the charge hose.

Open the low-pressure valve on the charge set slightly to purge air from the charge hose.

5. Set the 2-way valve to the close position.

6. Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa.

7. Immediately set the 3-way valve to the closed position.

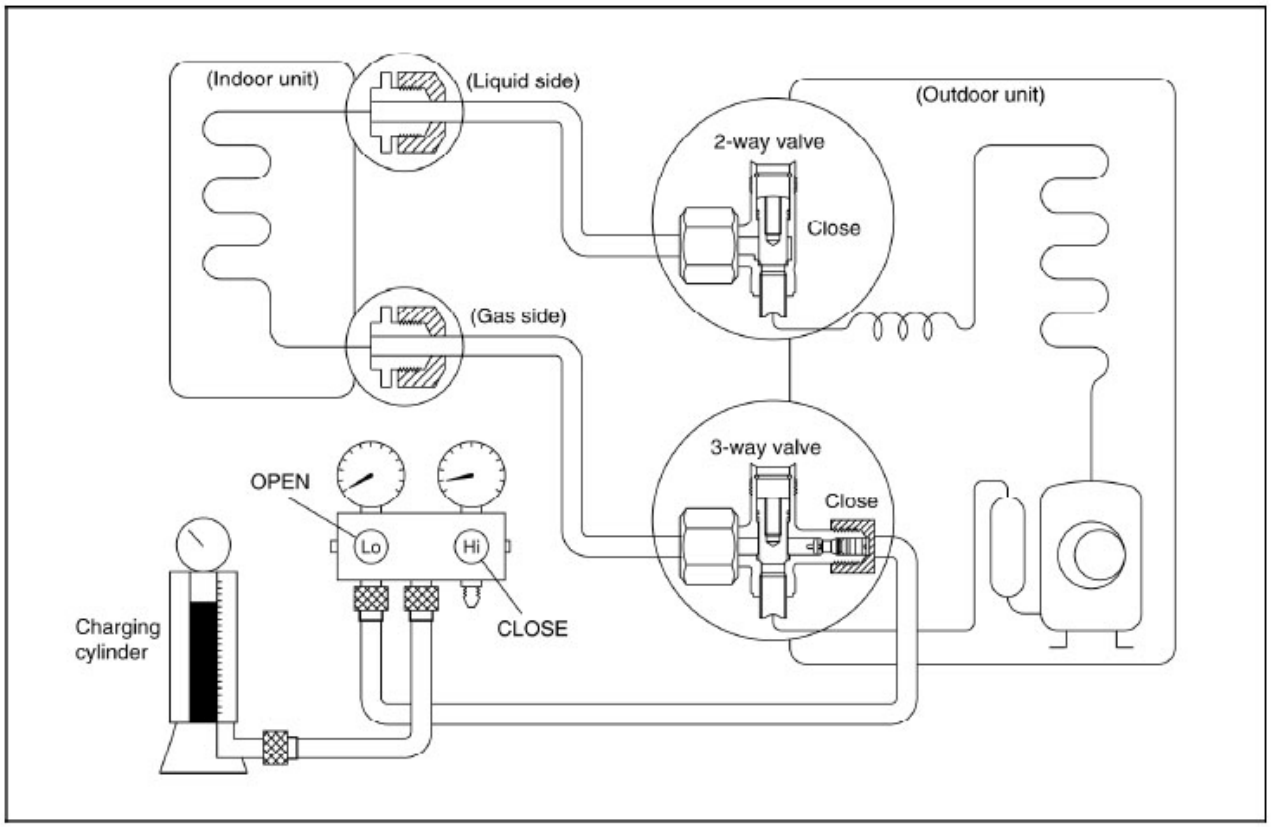
Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa.

8. Disconnect the charge set, and amount the 2-way and 3-way valve's stem nuts and service port caps.

Use a torque wrench to tighten the service port cap.

Be sure to check for gas leakage.

6.6 Re-air purging (Re-installation)



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the closed position.

2. Connect the charge set and a charging cylinder to the service port of the 3-way valve.

Leave the valve on the charging cylinder closed.

3. Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45’ for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut to on the 2-way valve.

4. Check the gas leakage.

Check the flare connections for gas leakage.

5. Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant until the gauge indicates 0.3 to 0.5 Mpa.

6. Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

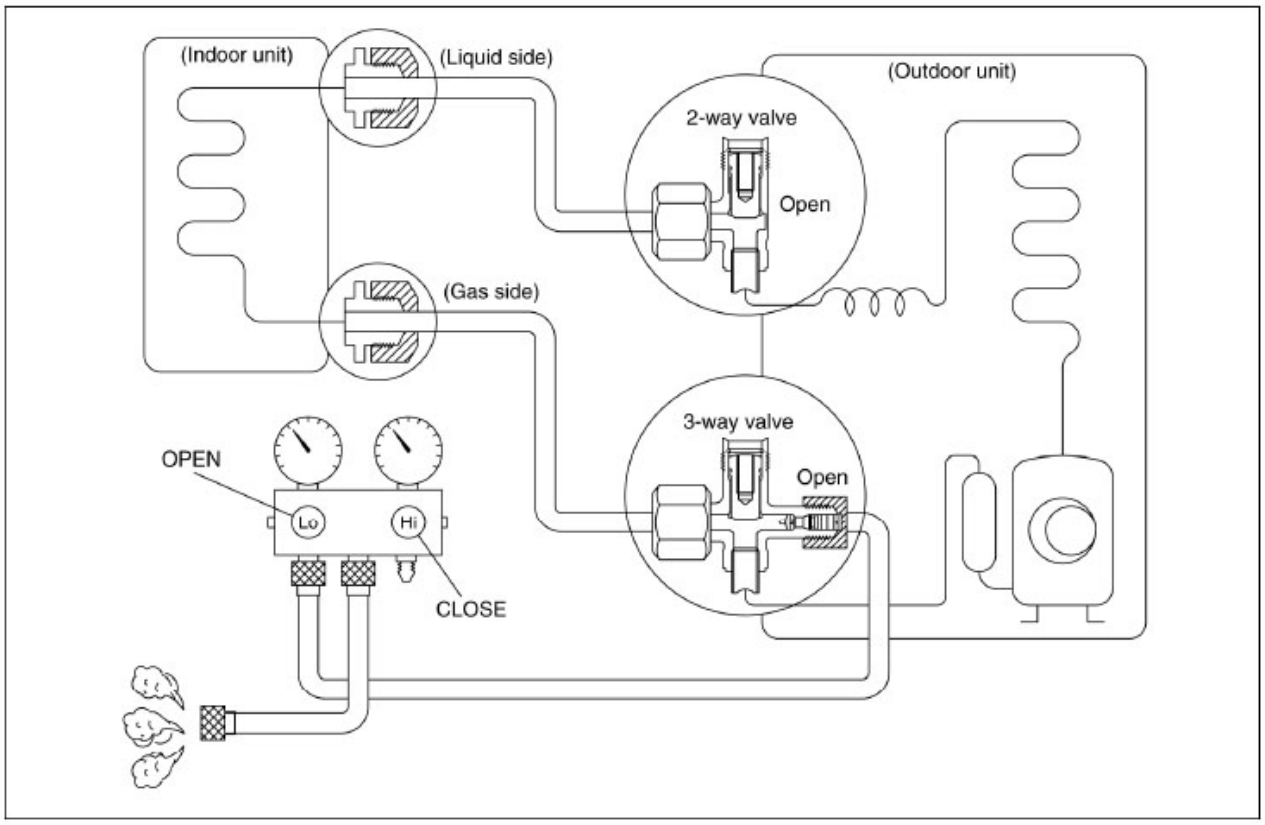
Be sure to use a hexagonal wrench to operate the valve stems.

7. Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap.

Be sure to check the gas leakage.

6.7 Balance refrigerant of the 2-way, 3-way valves



Procedure:

1. Confirm that both the 2-way and 3-way valves are set to the open position.

2. Connect the charge set to the 3-way valve's service port.

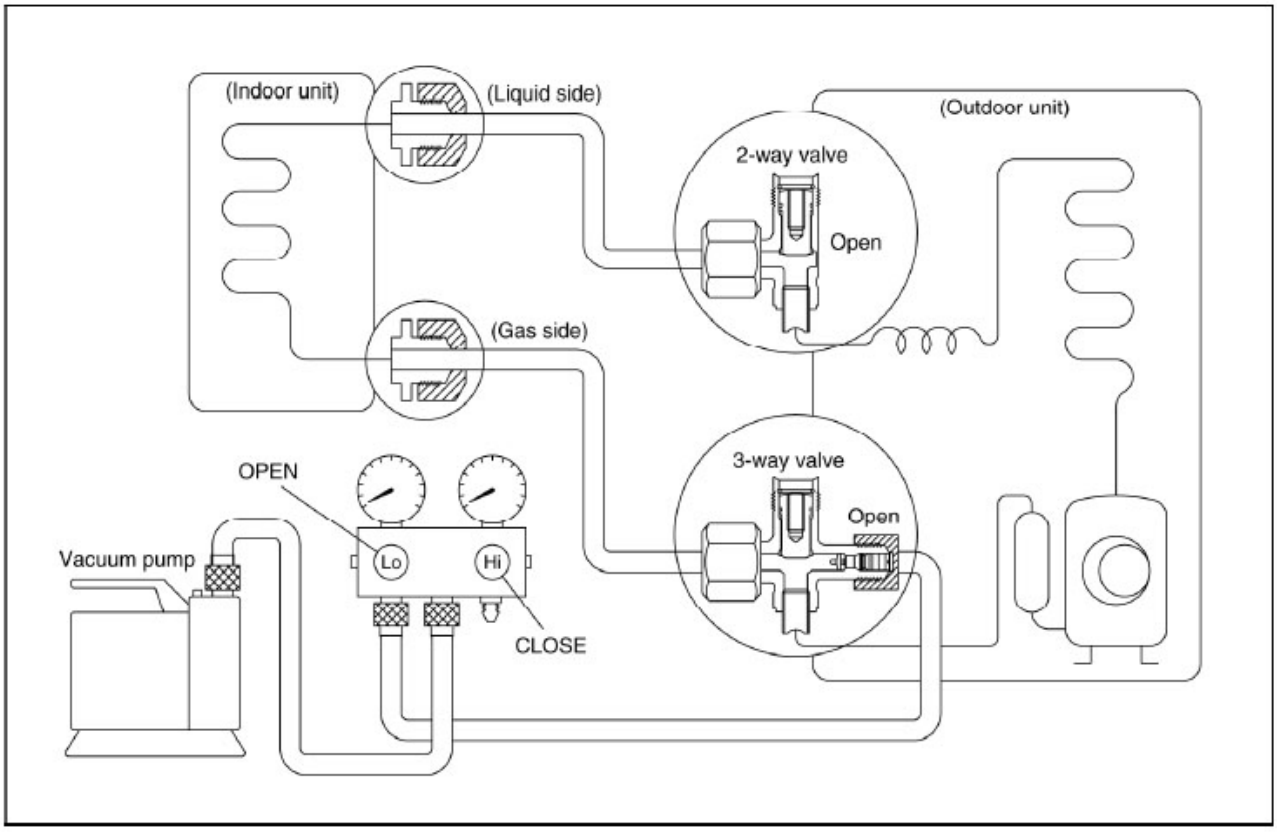
Leave the valve on the charge set closed.

Connect the charge hose with the push pin to the service port.

3. Open the valves (Low side) on the charge set and discharge the refrigerant until the gauge indicates 0.05 to 0.1Mpa.

If the pressure when the air conditioner is not running is higher than 0.1Mpa, discharge the refrigerant until the gauge indicates 0.05 to 0.1 Mpa. Discharge the refrigeration gradually; if it is discharged too suddenly, the refrigeration oil will be discharged.

6.8 Evacuation



Procedure:

1. Connect the vacuum pump to the charge set's centre hose.

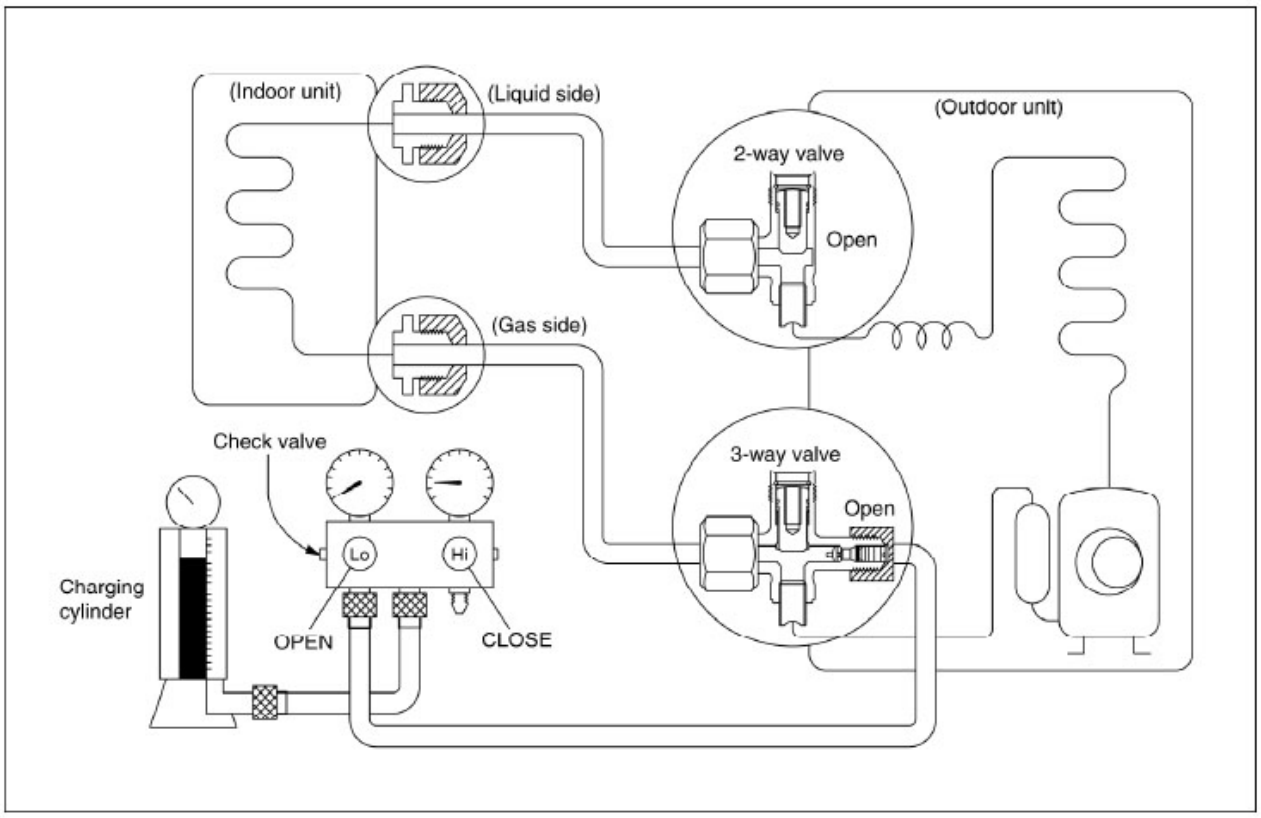
2. Evacuation for approximately one hour.

Confirm that the gauge needle has moved toward -0.1 Mpa (-76 cmHg) [vacuum of 4 mmHg or less].

3. Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

4. Disconnect the charge hose from the vacuum pump.

6.9 Gas charging



Procedure:

1. Connect the charge hose to the charging cylinder.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

2. Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3. Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

4. Disconnect the charge hose from the 3-way valve's service port immediately.

Stopping partway will allow the refrigerant to be discharged.

If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.

5. Mounted the valve stem caps and the service port

Use torque wrench to tighten the service port cap.

Be sure to check for gas leakage.

7. Operation characteristics

Mode / Temperature	Cooling operation	Heating operation	Drying operation
Room temperature	17°C ~ 32°C	0°C ~ 30°C	10°C~32°C (<21000Btu/h models)
			17°C~32°C (≥21000Btu/h models)
Outdoor temperature	18°C ~ 43°C	-7°C ~ 24°C	11°C~43°C (<21000Btu/h models)
	(-5°C ~ 43°C:For the models with low temperature cooling system)		18°C~43°C (≥21000Btu/h models)
	(21 °C ~ 52°C:For special tropical models		21 °C ~ 52°C (For special tropical models)

CAUTION:

1. If air conditioner is used outside of the above conditions, certain safety protection features may come into operation and cause the unit to function abnormally.

2. Room relative humidity less than 80%. If the air conditioner operates in excess of this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.

3. Optimum performance will be achieved within this operating temperature.

8. Electronic function

8.1 Abbreviation

T1: Indoor ambient temperature

T2: Coil temperature of indoor heat exchanger

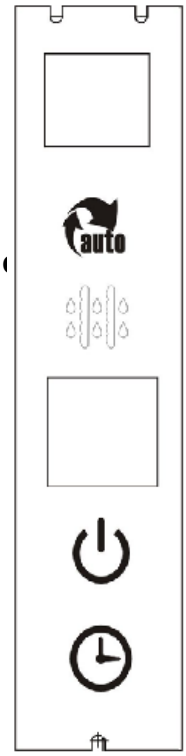
T3: Coil temperature of outdoor heat exchanger

T4: Outdoor ambient temperature

T5: Compressor discharge temperature

8.2 Display function

8.2.1 Icon explanation on indoor display board.



① **Auto indicator**

This indicator illuminates when the air conditioner is in AUTO

② **Timer indicator**

This indicator illuminates when TIMER is set ON/OFF.

③ **PRE.-DEF. Indicator (For Cooling & Heating models only)**

This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air
control feature is activated in heating mode.

④ **OPERATION indicator**

This indicator illuminates when the air conditioner is running.

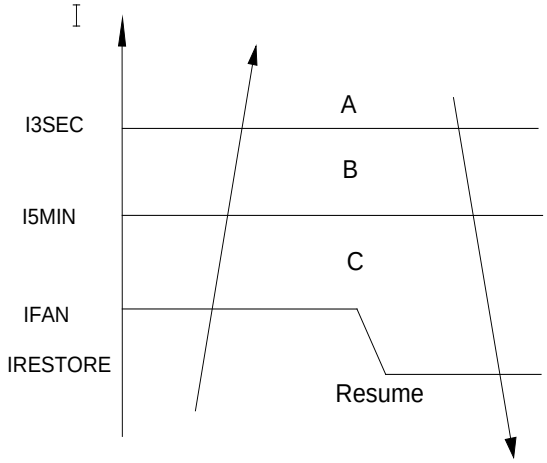
8.3 Main Protection

8.3.1 Time Delay at restart for compressor.

8.3.2 Fan Speed is out of control. (only for 7k,9k,18k models)

----When Indoor Fan Speed keeps too low or too high for certain time, the unit will stop and the LED will display the failure

8.3.3 Current protection



A zone : The current exceeds I_{3SEC} for 5 seconds, the compressor and outdoor fan will shut off.

B zone: The current exceeds I_{5min} for 5 minutes, the compressor and outdoor fan will shut off.

C zone: The current exceeds I_{FAN}, the outdoor fan will shut off if AC is in heating mode.If AC is in cooling mode, the indoor fan will run at low speed.

I_{3SEC} =8.5A, I_{5min} =6.5A, I_{FAN} =5.5A, $I_{RESTORE}$=4.5A for KSR1-07HRN1-QC2(A) models.

I_{3SEC} =10.0A, I_{5min} =8.5A, I_{FAN} =6.5A, $I_{RESTORE}$=5.5A for KSR1-09HRN1-QC2(A) models.

I_{3SEC} =16.0A, I_{5min} =15.0A, I_{FAN} =14.0A, $I_{RESTORE}$=12.0A for KSR1-18HRN1-QB8 models.

I_{3SEC} =16.0A, I_{5min} =15.0A, I_{FAN} =11.0A, $I_{RESTORE}$=9.5A for KSR1-18HR-QB6 model.

I_{3SEC} =22.0A, I_{5min} =20.0A, I_{FAN} =16.0A, $I_{RESTORE}$=14.0A for KSR1-21HRN1-QB8W models.

I_{3SEC} =26.0A, I_{5min} =24.0A, I_{FAN} =20.0A, $I_{RESTORE}$=18.0A for KSR1-24HRN1-QB8W models.

8.3.4 Zero crossing detection error protetion(only for 7k,9k,18k models)

If AC can not detect zero crossing signal for 4 minutes or the zero crossing signal time interval is not correct, the unit will stop and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

8.3.5 Indoor / outdoor units communication protection(only for 21k,24k models)

If the indoor units can not receive the feedback signal from the outdoor units for 2 minutes,the AC will stop and display the failure.

8.4 Operation Modes and Functions

8.4.1 Fan mode.

(1) Outdoor fan and compressor stop.

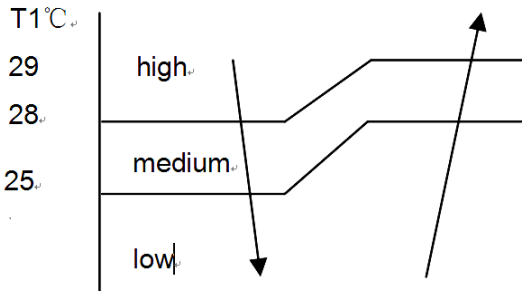
(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/med/low/auto.

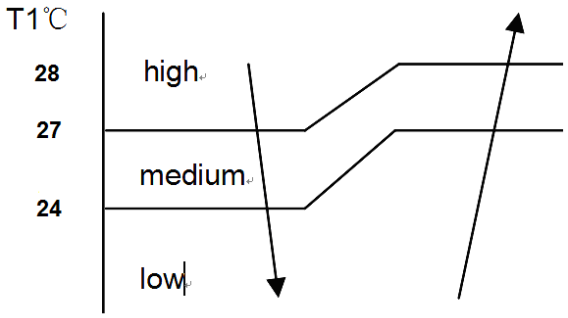
(4) The louver operates same as in cooling mode.

(5) Auto fan:

For 7k,9k,18k models:



For 21k, 24k models:

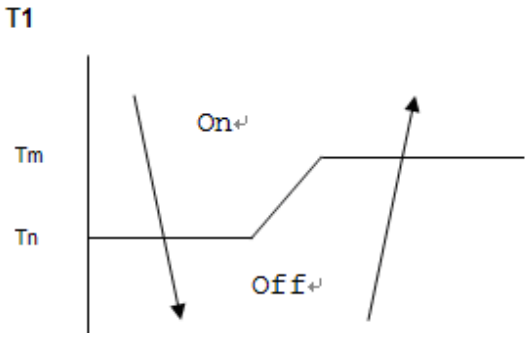


8.4.2 Cooling Mode

8.4.2.1 Compressor running rules:

Once the compressor starts up, it will follow the below rules:

When indoor room temp.T1 is lower than Tn, the compressor and outdoor fan will shut off. When T1 is higher than Tm, the compressor and outdoor fan will start up.



Tm=Ts+1, Tn=Ts.

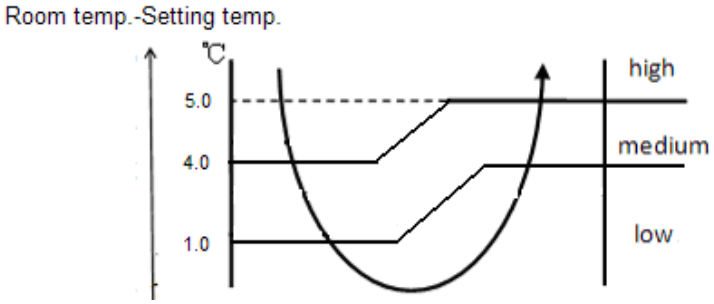
8.4.2.2 Outdoor fan running rules:

The On-off outdoor units have single fan speed. The outdoor fan will run following the compressor except when AC is in evaporator high temp.protection in heating mode ,condenser high temp.protection in cooling mode, defrosting mode and the current protection.

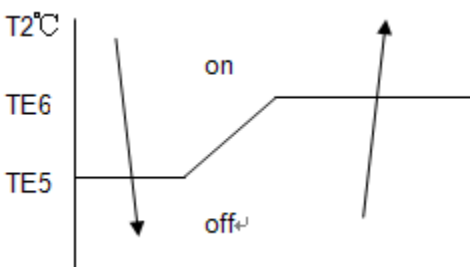
8.4.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

The auto fan:



8.4.2.4 Evaporator low temperature T2 protection.



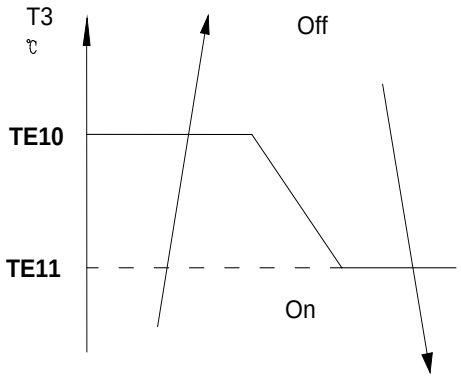
When the evaporator coil temp.T2 keeps lower than TE5 for 5 minutes(4 minutes for 21k,24k models), the compressor and outdoor fan will shut off.

When T2 is higher than TE6, the compressor and outdoor fan will restart up.

While TE5=4℃, TE6=10℃ for KSR1-07HRN1-QC2(A), KSR1-09HRN1-QC2(A) models; TE5=3℃, TE6=14℃for KSR1-18HRN1-QB8 model.

TE5=2℃, TE6=12℃for KSR1-21HRN1-QB8W , KSR1-21CR-QB6W , KSR1-21HR-QB6W KSR1-24HRN1-QB8W models.

8.4.2.5 Condenser high temperature T3 protection.(only for 21k,24k heat pump models)



When T3≥TE10, the compressor will shut off. When T3＜TE11,the compressor will restart.

TE10=65℃, TE11=55℃.

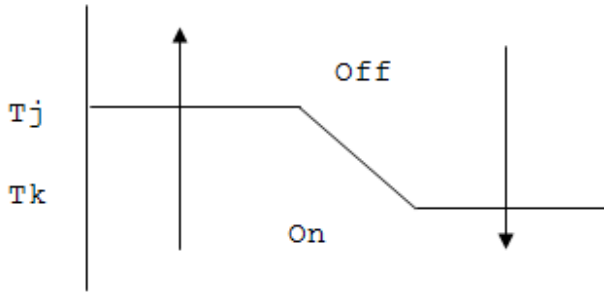
8.4.3 Heating Mode

8.4.3.1 Compressor running rules:

For 21k,24k models, everytime the compressors start up, they will keep running for △t minutes(protections are active) and then follow the below rules. (While△t=4.)

For other models, they will follow the below rules once the compressors start up:

When indoor room temp.T1 is higher than Tj, the compressor and outdoor fan will shut off. When T1 is lower than Tk, the compressor and outdoor fan will start up.



Tj=Ts+Tc

Tk=Ts+Tc-1. Tc=1℃for 7k,9k,18k models; Tc=4℃for 21k,24k models.

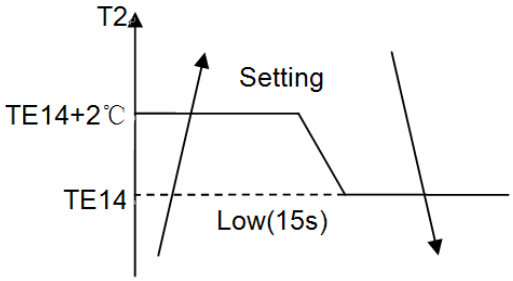
8.4.3.2 Outdoor fan running rules:

The outdoor units have single fan speed. The outdoor fan will run following the compressor except when AC is in evaporator high temp.protection in heating mode , condenser high temp.protection in cooling mode ,defrosting mode and the current protection.

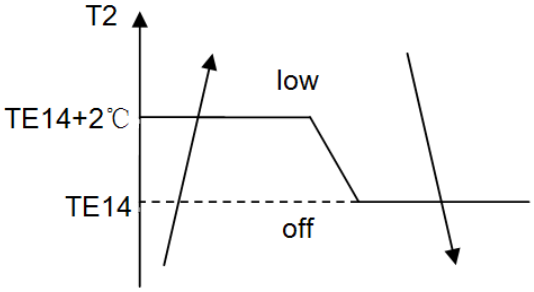
8.4.3.3 Indoor fan running rules:

For 21k,24k models,when the compressor is off because off the room temperature rising or the protection, the indoor fan will run as below rule:

For 21k model:



For 24k model:



While TE14=32℃

For all the models,when the compressor is on, the indoor fan can be set to high/med/low/auto.And the anti-cold wind function has the priority.

Anti-cold wind function:

When evaporator coil temp.T2 is getting higher,

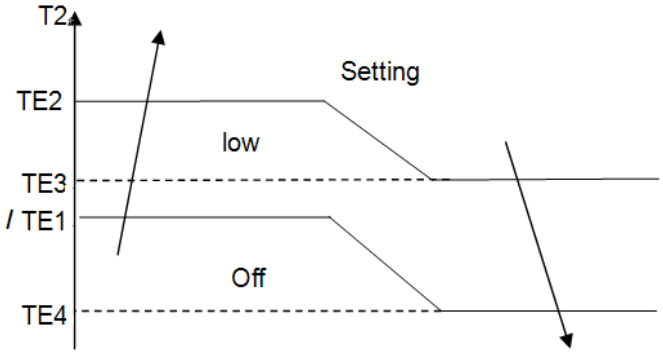
T2>TE2, the indoor fan will run at setting speed.

TE1<T2<TE2, the indoor fan will run at low speed.

When T2 is getting lower,

TE4<T2<TE3,the indoor fan will run at low speed.

T2<TE4, the indoor fan will shut off.

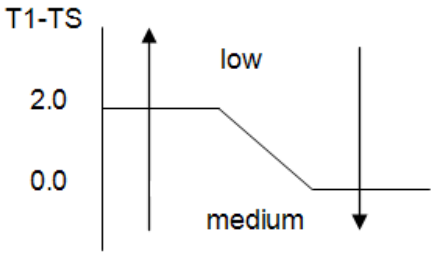


While TE1=28 °C, TE2=32°C, TE3=30°C, TE4=26°C for 7k,9k,12k models.

TE1=34 °C, TE2=36°C, TE3=34°C, TE4=20°C for 18k model.

TE1=25 °C, TE2=32°C, TE3=30°C, TE4=20°C for 24k models.

Auto fan action:



When T1-Ts>2℃, the indoor fan will run at low speed.

When T1-Ts≤0℃, the indoor fan will run at medium speed.

8.4.3.4 Defrosting mode：

For 7k,9k,18k models:

- **Condition of defrosting:**

AC will enter defrosting mode if any of the following items is satisfied.

(1) Both A and B are satisfied

A: The compressor keeps running for 40 minutes.

B: The evaporator coil temp.T2-Indoor room temp.T1 meets the below table.

℃	T2－T1
High speed	＜$TH_{DEFROST}$
Medium speed	＜$TM_{DEFROST}$
Low speed	＜$TL_{DEFROST}$
Breeze/off	No need to compare the T2 and T1

$TH_{DEFROST}$=15℃,$TM_{DEFROST}$=16℃,$TL_{DEFROST}$=17℃for KSR1-07HRN1-QC2(A) KSR1-09HRN1-QC2(A) models.

$TH_{DEFROST}$=17℃,$TM_{DEFROST}$=18℃,$TL_{DEFROST}$=19℃for MSR1-18HRN1-QB8 model.

(2) After the last defrosting, the time that the outdoor fan is off but the compressor is on in high T2 protection cumulates up to 90 minutes.

- **Condition of ending defrosting:**

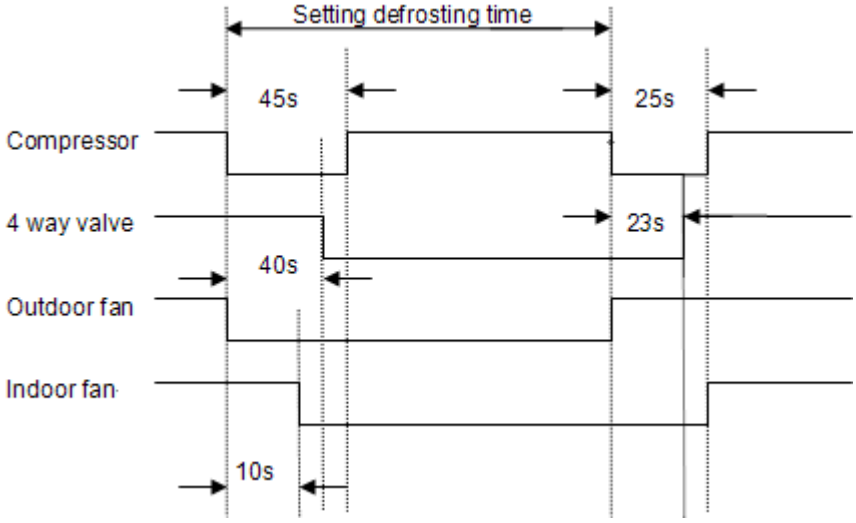
If any one of the following items is satisfied, the defrosting will terminate and the machine will turn to normal heating mode.

(1) The defrosting time is reached to the setting value.

(2) The compressor current reaches or overs $I_{DEFROST}$ for 7 seconds.

$I_{DEFROST}$=3.5A for 7k,9k models, $I_{DEFROST}$=7.5A for 18k models.

- **Defrosting action：**



About the setting defrosting time:

(1) Condition 1 of defrosting;

If case B happens before case A and lasts till case A happens, the setting defrosting time is 10 minutes.Otherwise the defrosting time is 7.5 minutes.

(2) Condition 2 of defrosting.

The defrosting time is 10 minutes.

(3) No matter what condition of defrosting is, if the defrosting time keeps 7.5 minutes for 3 times, it will

For 21k,24k models:

- **Condition of defrosting:**

AC will enter defrosting mode if any of the following items is satisfied.

(1) When T3＜TC1℃, if thecompressor keeps running over 40 minutes and T3＜TC3℃ for 3 minutes. While TC1= 0℃,TC3=－3℃.

(2) After the last defrosting, the time that the outdoor fan is off but the compressor is on in high T2 protection cumulates up to 90 minutes.

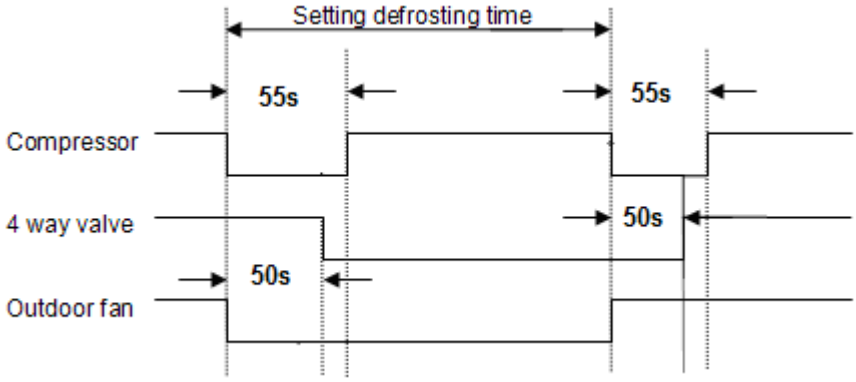
- **Condition of ending defrosting:**

If any one of the following items is satisfied, the defrosting will terminate and the machine will turn to normal heating mode.

(1) T3 rises to be higher than TC2. TC2= 20℃for 21k model, TC2= 30℃ for 24k model.

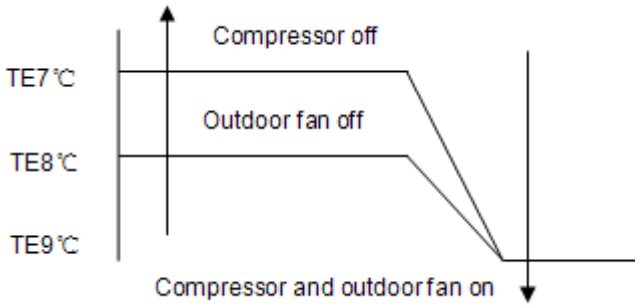
(2) The machine has run for 10 minutes in defrosting.

- **Defrosting action：**



8.4.3.5 High evaporator coil temp.T2 protection:

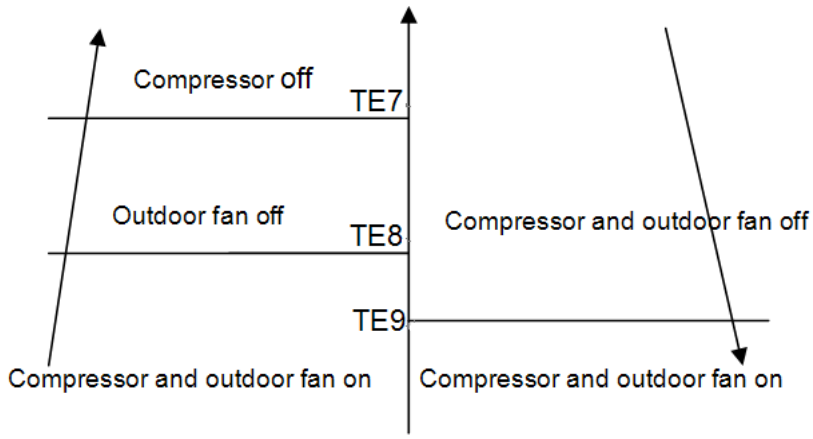
For 7k,9k,18k models:



While TE7=60℃,TE8=53℃,TE9=50℃ for 7k ,9k modesls,

TE7=60℃,TE8=52℃,TE9=51℃ for 18k models,

For 21k,24k models:



While TE7=63℃,TE8=57℃,TE9=50℃ for KSR1-21HRN1-QB8W model.

TE7=63℃,TE8=54℃,TE9=50℃ for KSR1-21CR-QB6W , KSR1-21HR-QB6W

KSR1-24HRN1-QB8W models.

8.4.4 Auto-mode

The machine will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

For 7k,9k,18k models:

ΔT=T1-Ts	Running mode
ΔT＞2℃	Cooling
-1≤ΔT≤2℃	Fan-only
ΔT<-1 ℃	Heating(for cooling only models,they will run at fan-only mode)

For 21k,24k models:

ΔT=T1-Ts	Running mode
ΔT＞2 ℃	Cooling
-1<ΔT ≤2℃	Fan-only
ΔT≤-1 ℃	Heating(for cooling only models,they will run at fan-only mode)

AC will run in auto mode in the below cases:

（1） Press the forced auto button.

（2） If AC is off,it will run in auto mode when timer on function is active.

（3） After setting the mode, AC will run in auto mode if the compressor keeps not running for 15 minutes.

8.4.5 Drying mode

For 7k,9k,18k models:

8.4.5.1 The indoor fan will run following the compressor.If the compressor is on ,the indoor fan will run at low speed.If the compressor is off, the indoor fan will run at breeze.

Running rules:

No	Condition	Indoor fan	Compressor and outdoor fan
1	T1 ≥ TS+2	Low Breeze	ON 6 minutes OFF 4 minutes
2	TS ≤T1＜TS+2	Low Breeze	ON 5 minutes OFF 5 minutes
3	T1 ＜ TS	Low Breeze	ON 4 minutes OFF 6 minutes

8.4.5.2 In drying mode, if room temperature is lower than 10 ℃, the indoor fan will run at breeze while the compressor and outdoor fan will stop and not resume until room temperature exceeds 13 ℃.

8.4.5.3 System protection is active in this mode.

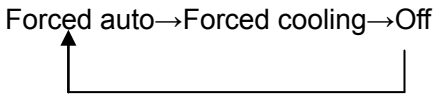
For 21k,24k models:

8.4.5.4 The indoor fan will keep running at low speed.

8.4.5.5 The outdoor fan,compressor and all the protections are the same with cooling mode.

8.4.6 Forced operation function

Press the touch button continually, the AC will run as below sequence:



Forced cooling mode:

The compressor and outdoor fan keep running and the indoor fan runs at low speed. After running for 30 minutes, AC will turn to drying mode(AC will turn to auto mode for 21k,24k models) with 24℃ setting temperature.

Forced auto mode:

The action of forced auto mode is the same as normal auto mode with 24℃ setting temperature.

- When AC receives signals, such as switch on, switch off, timer on, timer off, mode setting, fan speed setting, sleeping mode setting, follow me setting, it will quit the forced operation.
- The forced operation function can not be memorized if power off.

8.4.7 Timer function

8.4.7.1 Timing range is 24 hours.

8.4.7.2 Timer on. The machine will turn on automatically when reaching the setting time.

8.4.7.3 Timer off. The machine will turn off automatically when reaching the setting time.

8.4.7.4 Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.

8.4.7.5 Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.

8.4.7.6 For 7k,9k,18k models,the timer function will not change the AC current operation mode.

Suppose users set the “timer off” function and AC is off now, the AC will keep the current running mode and then turn off when reaching the setting time.For 21k,24k models, the timer function will change the AC current operation mode. Suppose users set the “timer off” function and AC is off now, the AC will turn on firstly and then turn off when reaching the setting time.

8.4.7.7 The setting time is relative time.

8.4.8 Sleep function mode

8.4.8.1 Operation time in sleep mode is 7 hours. After 7 hours, the AC quits this mode and turns off.

8.4.8.2. Operation process in sleep mode is as follow:

After pressing ECONOMIC or SLEEP button on controller, the machine will turn into sleep mode.

When cooling, the setting temperature rises 1 ℃(be lower th

setting temperature stops rising and indoor fan is fixed as low speed.

When heating, the setting temperature decreases 1 ℃(2 hours later than 17℃) e

later the setting temperature stops rising and indoor fan is fixed as low speed.(Anti-cold wind function has the priority)

8.4.8.3 Timer setting is available.

8.4.8.4 When user uses timer off function in sleep mode(or sleep function in timer off mode), if the timing is less than 7 hours, sleep function will be cancelled when reaching the setting time. If the timing is more than 7 hours, the machine will not stop until reaches the setting time in sleep mode.

8.4.9 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including Swing function) automatically after 3 minutes when power returns.

If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and then turn to drying mode（auto mode for 21k,24k models）as 24 ℃ setting temperature.

8.4.10 Ionizer/Plasma dust collector function (optional)

The indoor unit is equipped with Ionizer, which is controlled by the CLEAN AIR button on the remote controller. When the unit is turned on, press the CLEAN AIR button to activate the function. Press it again to stop the function. During the time when Ionizer being controlled by remote controller, Ionizer will be turned off automatically, if indoor fan stops running due to malfunctions or anti-cold-wind. When

indoor fan restarts after malfunctions being eliminated and anti-cold-wind being released, Ionizer will be available again.

9. Troubleshooting

9.1 Indoor unit error display

For 7k,9k,18k models:

Operation lamp	Timer lamp	Failure
☆	X	Indoor fan speed has been out of control
☆	O	The T1 or T2 sensor is open circuit or short circuit
X	☆	Over current protection occurs 4 times.
O	☆	EEPROM error
☆	☆	Zero crossing detection error

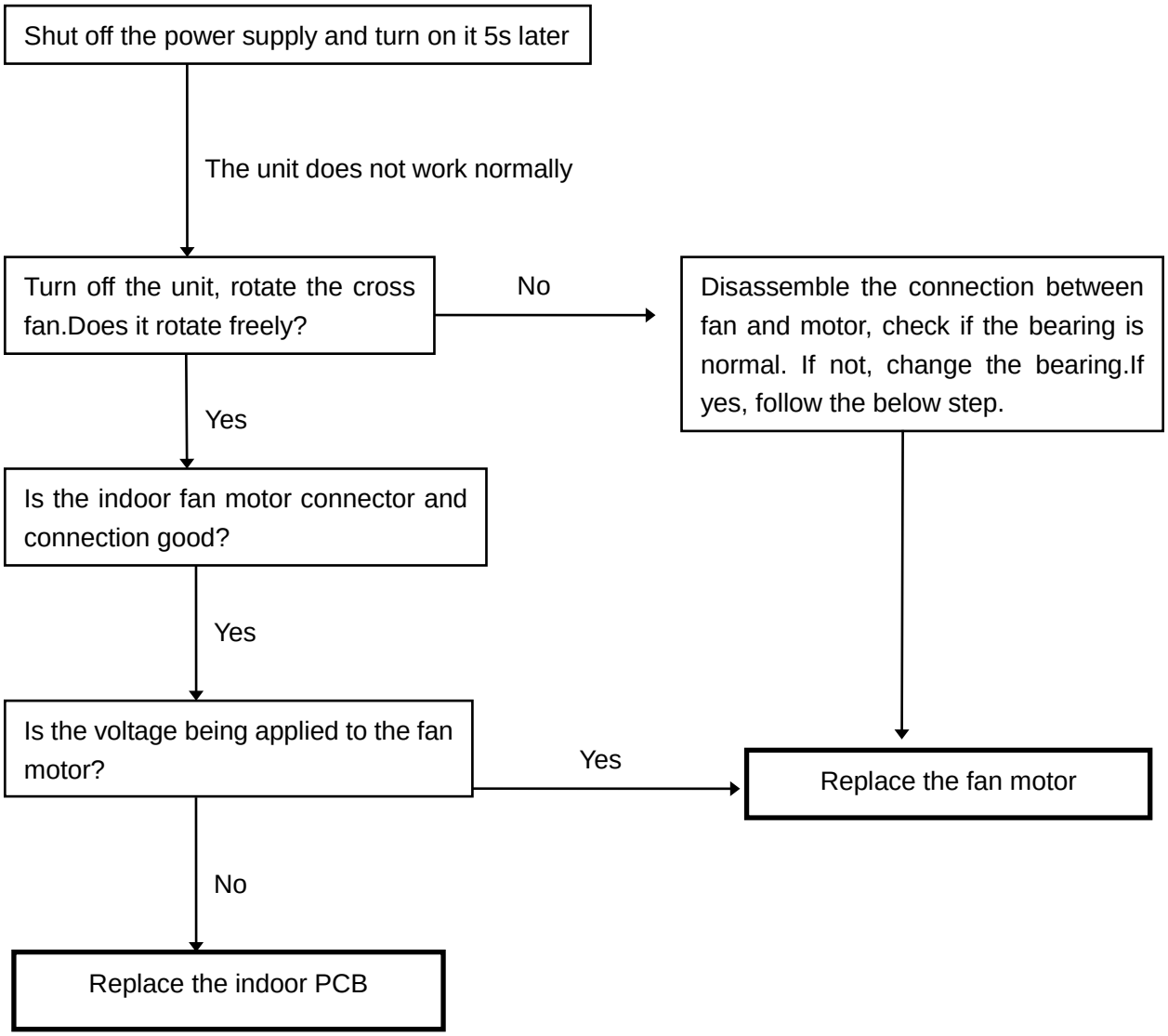
For 21k,24k models:

Operation lamp	Timer lamp	Defrosting lamp	Auto lamp	Failure
☆	☆	☆	X	Over current protection occurs 4 times.
☆	X	X	X	The T2 sensor is open circuit or short circuit
X	☆	X	X	The T1 sensor is open circuit or short circuit
X	X	☆	X	The T3 sensor is open circuit or short circuit
☆	☆	X	X	EEPROM error
X	X	X	☆	Indoor / outdoor units communication error
X	X	☆	☆	Outdoor units protection

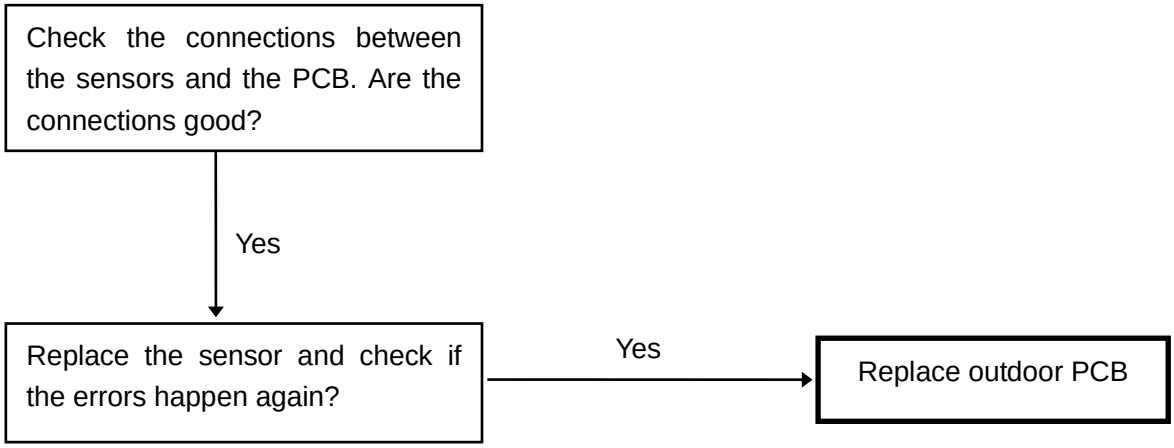
O （light） X （off） ☆ （flash）

9.2 Diagnosis and Solution

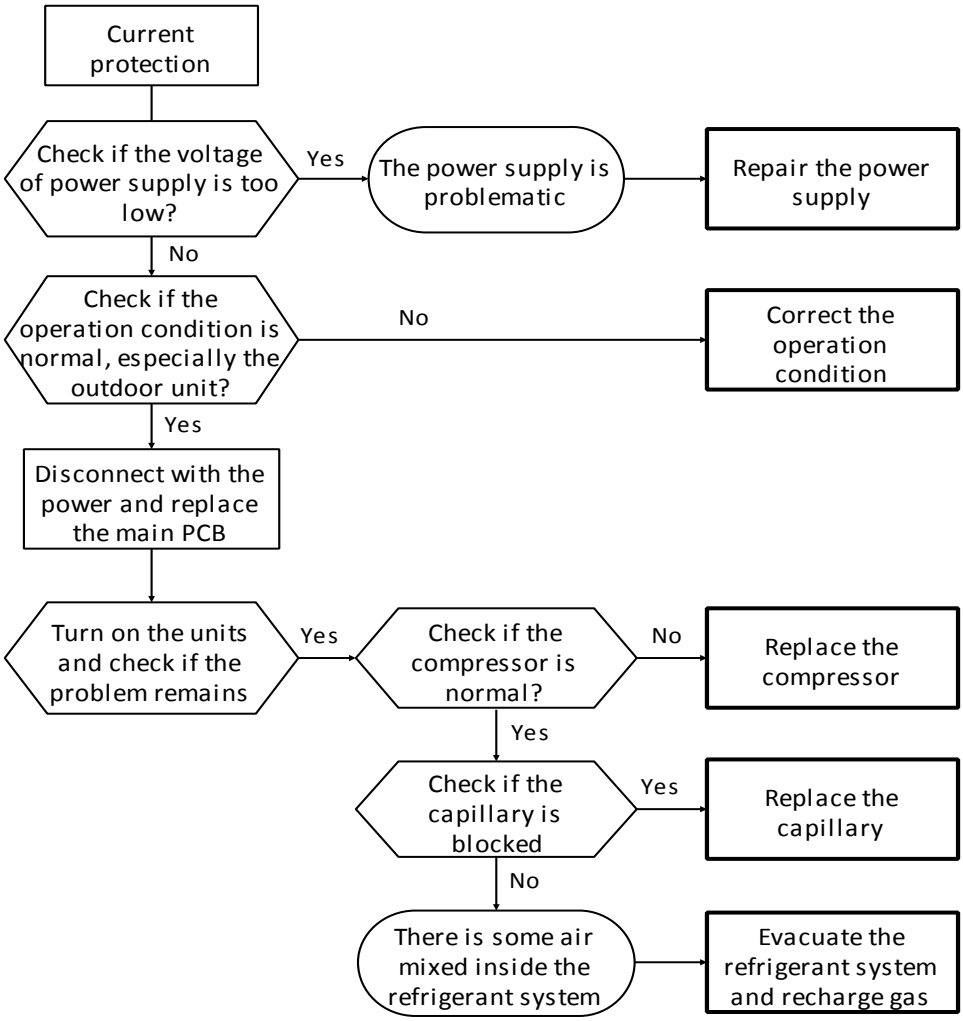
9.2.1 Indoor fan speed out of control diagnosis


Shut off the power supply and turn on it 5s later
The unit does not work normally
Turn off the unit, rotate the cross fan.Does it rotate freely?
No
Disassemble the connection between fan and motor, check if the bearing is normal. If not, change the bearing.If yes, follow the below step.
Yes
Is the indoor fan motor connector and connection good?
Yes
Is the voltage being applied to the fan motor?
Yes
Replace the fan motor
No
Replace the indoor PCB

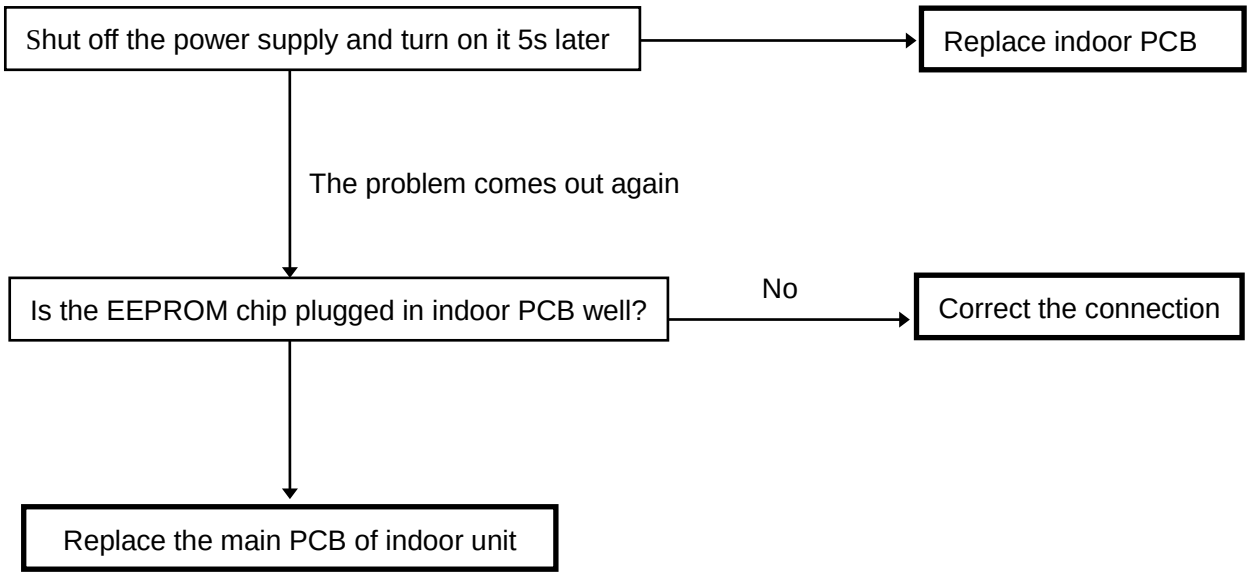
9.2.2 Open or short circuit of temperature sensor diagnosis and solution.


Check the connections between the sensors and the PCB. Are the connections good?
Yes
Replace the sensor and check if the errors happen again?
Yes
Replace outdoor PCB

9.2.3 Over current protection occurs 4 times.


Current protection
Check if the voltage of power supply is too low?
Yes
The power supply is problematic
Repair the power supply
No
Check if the operation condition is normal, especially the outdoor unit?
No
Correct the operation condition
Yes
Disconnect with the power and replace the main PCB
Turn on the units and check if the problem remains
Yes
Check if the compressor is normal?
No
Replace the compressor
Yes
Check if the capillary is blocked
Yes
Replace the capillary
No
There is some air mixed inside the refrigerant system
Evacuate the refrigerant system and recharge gas

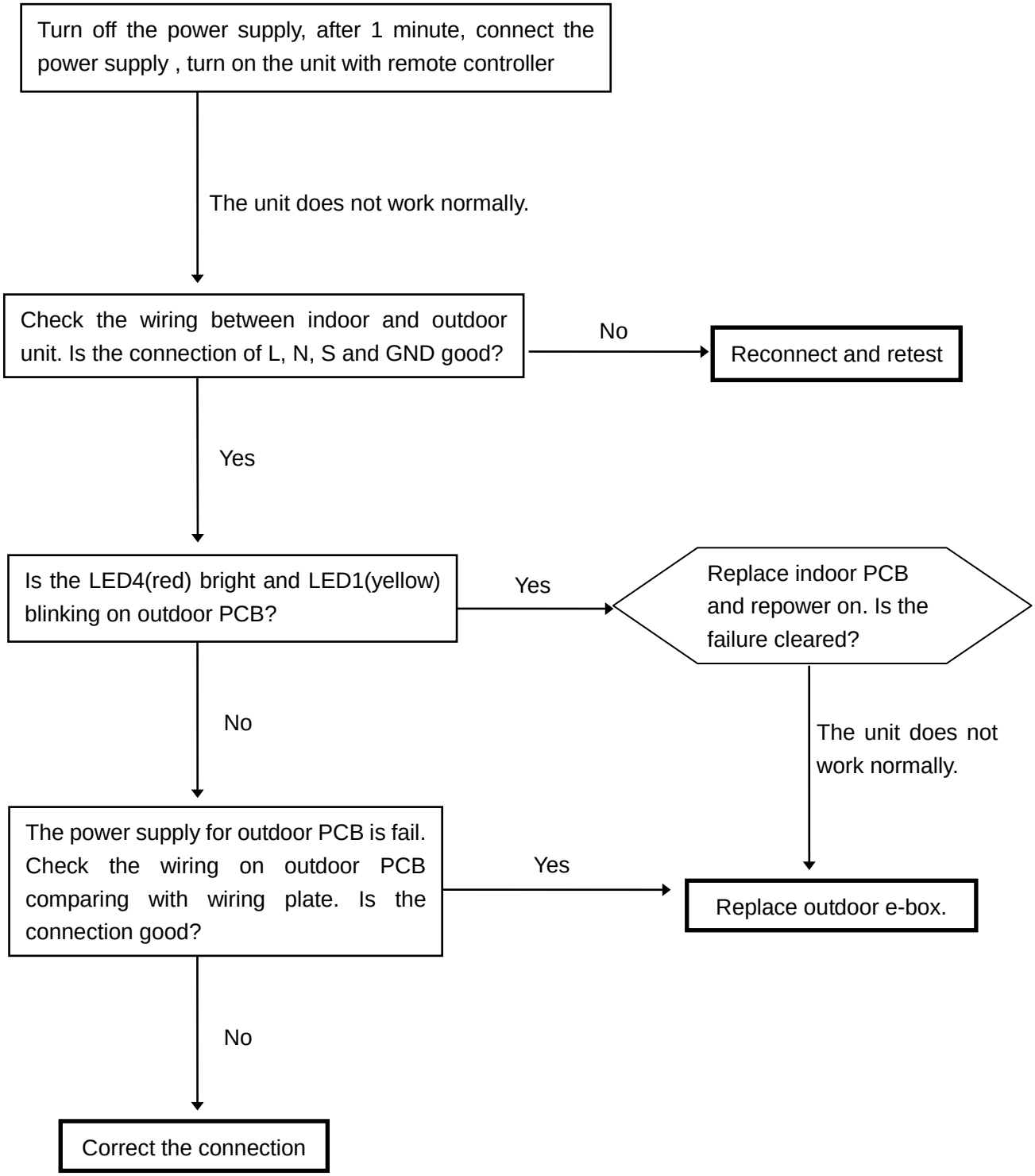
9.2.4 EEPROM parameter error diagnosis and solution


Shut off the power supply and turn on it 5s later
Replace indoor PCB
The problem comes out again
Is the EEPROM chip plugged in indoor PCB well?
No
Correct the connection
Replace the main PCB of indoor unit

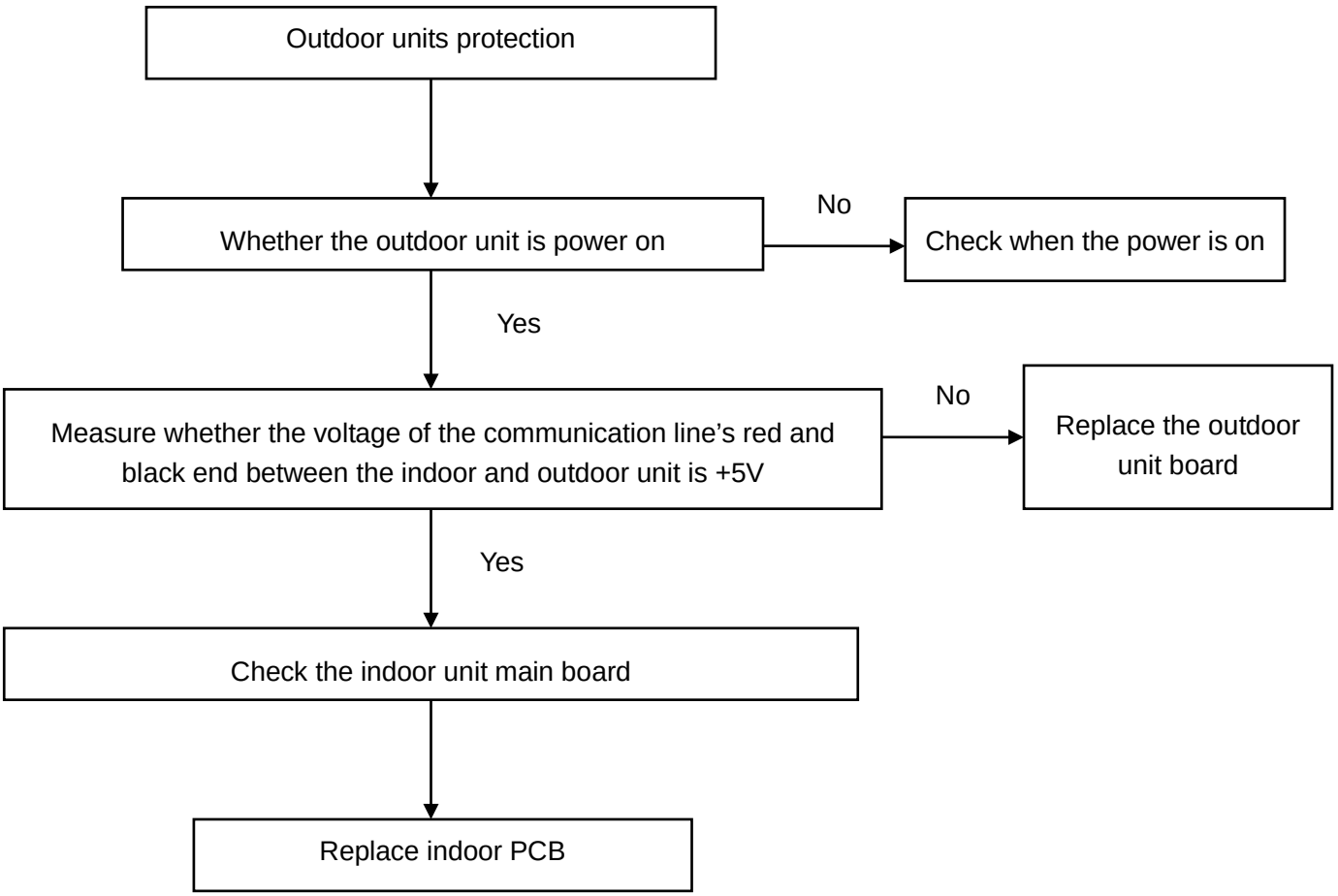
9.2.5 Zero crossing detection error

When such failure occurs, the main control board must have fault.

9.2.6 Indoor / outdoor units communication error


Turn off the power supply, after 1 minute, connect the power supply , turn on the unit with remote controller
The unit does not work normally.
Check the wiring between indoor and outdoor unit. Is the connection of L, N, S and GND good?
No
Reconnect and retest
Yes
Is the LED4(red) bright and LED1(yellow) blinking on outdoor PCB?
Yes
Replace indoor PCB and repower on. Is the failure cleared?
No
The unit does not work normally.
The power supply for outdoor PCB is fail. Check the wiring on outdoor PCB comparing with wiring plate. Is the connection good?
Yes
Replace outdoor e-box.
No
Correct the connection

9.2.7 Outdoor units protection


Outdoor units protection
Whether the outdoor unit is power on
No
Check when the power is on
Yes
Measure whether the voltage of the communication line's red and black end between the indoor and outdoor unit is +5V
No
Replace the outdoor unit board
Yes
Check the indoor unit main board
Replace indoor PCB